School of Psychology and Speech Pathology

Treating Anxiety in Adolescents with Autism Spectrum Disorder using Group Cognitive Behaviour Therapy: A Randomised Controlled Trial

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Thesis Declaration

To the best of my knowledge and belief, this thesis contains no material previously published by any other person except where due acknowledgement has been made.

This thesis contains no material which has been accepted for the award of any other degree or diploma in any university.

Signed: 

Date: 1st July 2018

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List of Abbreviations

ADIS	Anxiety Disorders Interview Schedule
ADHD	Attention Deficit Hyperactivity Disorder
ANOVA	Analysis of Variance
ASD	Autism Spectrum Disorders
CBT	Cognitive Behaviour Therapy
CONSORT	Consolidated Standards of Reporting Trials
DSM-IV-TR	Diagnostic and Statistical Manual of Mental Disorder 4th edition, text revision
DSM-5	Diagnostic and Statistical Manual of Mental Disorder 5th edition
GAD	Generalised Anxiety Disorder
GLMM	Generalised Linear Mixed Models
ICC	Intra-class Correlation
ICE	Independent Clinical Evaluator
M	Mean
MLM	Multi-Level Linear Modelling
n	Sample Size
OCD	Obsessive Compulsive Disorder
RCI	Reliable Change Index
RCT	Randomised Controlled Trial
SCAS	Spence Children's Anxiety Scale
SD	Standard Deviation
SE	Standard Error of Measurement
SMFQ	Short Moods and Feelings Questionnaire
SPSS	Statistical Package for Social Sciences

Abstract

Adolescents with high functioning autism spectrum disorders (ASD) are commonly diagnosed with at least one comorbid anxiety disorder (Kerns et al., 2015; Wood et al., 2014), with multiple studies reporting prevalence rates of anxiety disorders ranging from 42 to 85% for individuals with ASD . Despite indicators that anxiety in adolescents with ASD is more acute and multi-faceted, with simultaneous social, emotional, physical and hormonal changes taking place during this developmental stage, researchers have primarily concentrated on studying children with ASD.

In the past, therapists have refrained from using cognitive behavioural therapy (CBT) with youth with ASD due to unique challenges that are likely to hinder therapeutic engagement and successful treatment outcomes, such as communication and cognitive deficits . However, in recent years, researchers have been successful in modifying traditional CBT programs to reduce anxiety in children with ASD . To date, randomised controlled trials investigating CBT for early and older adolescents with ASD and anxiety remain scarce.

This thesis contains two connected studies that seek to address this gap. Study one evaluated the efficacy of using a manualised, family-based group cognitive-behavioural therapy (CBT) to reduce anxiety symptoms in adolescents aged between 12 and 18 years (M = 14.23) (the *Cool Kids Child Anxiety Program: ASD Adaptation*; . Forty-nine participants were randomly assigned to either a waitlist (WL) or CBT intervention condition. Adolescents in the CBT intervention group, along with one of their primary caregivers attended 12 CBT sessions. At post-treatment, adolescents randomised to the CBT condition demonstrated significant reductions in anxiety severity compared to those in the WL condition. This was determined by diagnostic status, clinical severity ratings (CSRs), and parent/adolescent ratings. Furthermore, parents in the CBT group reported a significant increase in measures of family quality of life. For the CBT group, all treatment gains were maintained at six-month follow-up with 79.2% of the CBT group demonstrating remission of their primary anxiety disorder diagnosis.

The aim of Study two was to determine the social validity of group CBT treatment using both quantitative and qualitative methodologies. Adolescents reported that the program was easy to understand, and that the skills they learnt were useful. In addition, parents reported high satisfaction with the content covered in the program. Qualitatively, more than half of the adolescents reported benefits from interacting with

others who were experiencing similar difficulties although they expressed a preference for less writing in the workbook. Parents reported feeling "empowered," with a new ability to assist their adolescent in managing his/her anxiety.

Although this research has several limitations, collectively, these novel and clinically significant findings contribute toward establishing the efficacy for group, manualised, family-based CBT treatment for both adolescents, including older adolescents with ASD and comorbid anxiety. The broader implication of the results for clinicians is that the *Cool Kids Child Anxiety Program: ASD Adaptation* is an easily adaptable and cost-effective group treatment for this previously neglected population.

Chapter 1: Introduction and Literature Review

1.1 Overview

This thesis is comprised of two connected studies that aim to increase understanding and knowledge of how anxiety presents and can be treated in adolescents with high functioning ASD and comorbid anxiety. Despite the high prevalence of anxiety disorders in these adolescents (, and a recent surge of research in the area of ASD and anxiety generally, the relationship between anxiety and ASD remains unclear.

In an attempt to investigate anxiety in adolescents with ASD, the history, diagnosis, and prevalence of autism will be explored in this chapter. An important first step is to define the presentation and trajectory of anxiety in typically developing adolescents. Comparatively, does anxiety in youth with ASD differ? Furthermore, can anxiety be considered a separate entity to ASD or does it derive and/or develop from the ASD core deficits? Here it is argued that the nature of anxiety in those with ASD manifests differently to youth of typical development. There appears to be unique factors to ASD that may aid in the growth and continuance of anxiety symptomology and these are examined.

In chapter 2, interventions aimed at reducing anxiety in youth with ASD are reviewed. It is well documented that specific barriers to participation and engagement in therapy are common for this client group and therefore these are investigated, along with the modifications that can be implemented to lead to more successful engagement and treatment outcomes. The research on psychological interventions for anxiety in individuals with ASD is the main focus of this review.

One limitation of the literature has been the notable absence of RCTs evaluating the efficacy of group CBT to reduce anxiety, in older adolescents with ASD and comorbid anxiety. Chapter 3 presents study one: Chilled out: A family-based, group CBT approach for treating anxiety in adolescents with high functioning ASD. Group treatment is an economical alternative to individual therapy, which is often expensive for parents and therefore difficult to access. In addition, group treatments may provide therapeutic benefits . The findings of this study have the potential to inform clinical practice and treatment, and improve the quality of life for adolescents with ASD and their families.

Chapter 4 provides a detailed description and the results of study 2, which explores the social validity of the intervention. The thoughts, experiences and voices of the participants are presented and contribute to the overall evaluation and effectiveness of the program.

Conclusions will be drawn in chapter 5 through discussion of the key findings from the two studies, theoretical and clinical implications, study strengths and limitations and recommendations for future research.

1.2 History, Definition and Prevalence of ASD

1.2.1 History of autism spectrum disorders. There has been an influx of research since Kanner , an Austrian psychiatrist recruited to John Hopkins Hospital in North America, adopted this term to describe the presentation of eleven children from his clinic. He documented these children as having early infantile autism, or "inborn autistic disturbances of affective contact" (Kanner, 1943, p. 50), with more interest in objects than people and an overriding preference for aloneness (Kanner, 1943). In addition, the children he observed demonstrated language delays, an inability to use language for communication, literalness, and a strong need for "'sameness" (Kanner, 1943).

In 1945, although not widely recognised at the time, Austrian psychiatrist, Hans Asperger, had studied a small group of children with similar presentations. Forty years later drew upon this work and devised the classification "Asperger's Syndrome" to define the children with ASD (without intellectual impairment) that she was working with (Wing, 1981). More recently it was recognised that in 1926 a Russian neurology student, Ssucharawa published a research paper with a description of a child that would today be described as having Asperger's syndrome (McDonald, 2010). At the time however, Ssucharawa's description was originally known as Schizoid Personality Disorder (McDonald, 2010).

With an increase in studies investigating the causes and features of autism, the idea that autism was embedded within the group of schizophrenia disorders was discounted due to differing onset, clinical presentation, and family history (Volkmar & McPartland, 2014). Similarly expurgated was parenting as a cause of autistic behaviours (Volkmar & McPartland, 2014). As of consequence, the employment of behavioural techniques over psychoanalytic practices for treatment of autism occurred. Here, the view that parents causing autism was for the most part discounted, and the notion that they could be used to assist in their child's therapy was introduced

(McDonald, 2014). Studies began to demonstrate the effectiveness of structured behavioural treatment compared to unstructured psychotherapy and this guided treatment for children with ASD (Lovaas, 1987; McDonald, 2014; Schopler & Mesibov, 1984).

1.2.2 Autism as a diagnosis. In 1980, Autistic Disorder, a label closely fitting Kanner's observations, was added to the Diagnostic and Statistical Manual 3rd edition (DSM-III) within the Pervasive and Developmental Disorders category (Association, 1980). In response to this classification, Wing (1981) explained that the presentation of the individuals that she had studied more closely resembled those described by Asperger (Asperger, 1944 in Feinstein, 2010) than those proclaimed by Kanner (1943). Wing's (1981) article greatly informed the formulation of Asperger's Syndrome/Disorder as a sub-classification within the spectrum of Autism in both the *International Classification of Diseases* (*ICD-10*; World Health Organization, 1992) and the *Diagnostic and Statistical Manual of Mental Disorders* (4th ed; *DSM-IV;* American Psychiatric Association, 2000; Attwood, 2007; McDonald, 2014). Here, the categories of "Childhood Disintegrative Disorder", "Rett's Disorder" and "Asperger's Disorder" were added under the umbrella classification of "Pervasive Developmental Disorders" (Feinstein, 2010).

More recently, the fifth edition of the Diagnostic and Statistical Manual of Mental Disorders (5th ed.; DSM-5; American Psychiatric Association, 2013) has seen three separate diagnosis (Autistic Disorder, Asperger Syndrome and Pervasive Developmental Disorder-Not Otherwise Specified (PDD-NOS), integrated into a single label, Autism Spectrum Disorder (Esler & Ruble, 2015). The diagnosis Autism Spectrum Disorder now encompasses two domains which include deficits in social communication and interaction, and restricted and repetitive patterns of behaviour, interests or activities. Sensory hyper-or hypo-reactivity behaviours have now been recognised and included in the diagnostic criteria under the latter domain (American Psychiatric Association, 2013).

Diagnostically, the manner in which children may differ in their presentation now relies upon two clinical features. The first is a rating given to the severity of symptoms within the two domains of deficits. These range from Level 1 (which indicates that support is required) to Level 3 (indicating that the individual requires very substantial support). Secondly, clinical specifiers are acknowledged such as, intellectual disability, ADHD, anxiety disorders, and specific language disorder (American Psychiatric Association, 2013). This supplementary information provides

a deeper clinical picture of the person with ASD compared to previous diagnostic criteria (Volkmar & McPartland, 2014).

1.2.3 Terms. Currently, within the ASD community there is discussion over the correct terms to use to refer to individuals with ASD. Some individuals with ASD have rejected the term disorder and prefer simply "autism" or "autism spectrum condition". Other individuals with ASD prefer identity-first language such as the term "autistic." This depicts ASD as part of who they are rather than a disorder or temporary condition that they have. While acknowledging the important voices of adults on the autism spectrum who prefer identity-first language, in accordance with the DSM-5 and literature in this area, the term autism spectrum disorder (ASD) will be used in this thesis. For the purposes of this study, this term will refer collectively to individuals diagnosed with an autism spectrum disorder without intellectual disability, unless otherwise specified.

1.2.4 Prevalence of ASD. Over the past two decades there has been a dramatic rise in the identification of ASDs (Baxter et al., 2015; White et al., 2009). The broadening of the diagnostic criteria and improved sampling methods are purported to be the main reasons for this (Rutter, 2011; White et al., 2009). Other contributing factors include, improved diagnostic instruments that assist in differentiating types of ASD, separating ASD from other psychiatric disorders, and increased awareness and recognition of ASD (Elsabbagh et al., 2012; White et al., 2009). The question of whether there has been an increase in incidence of ASD or whether the above factors explain the dramatic rise in prevalence is still up for debate (Baxter et al., 2015).

Both nationally and internationally prevalence has been reported to be between 50-100 individuals in every 10,000 (Randall et al., 2015; Williams, MacDermott, Ridley, Glasson, & Wray, 2008). For a systematic review of epidemiology of ASD see Elsabbagh et al. (2012). Within Australia, approximately 164,000 people were estimated to have ASD which equates to approximately 1 in 150 people. (Australian Bureau of Statistics, 2016). In a recent study by the Centers for Disease Control and Prevention (CDC; Christensen et al., 2016), prevalence rates of ASD in the United States have been reported to be 1 in 68 children (1 in 42 boys and 1 in 189 girls). Higher rates of prevalence of ASD in males are consistently reported (Randall et al., 2015).

1.3 Anxiety

1.3.1 Anxiety defined. Silverman and Field (2011) define anxiety as, "…a set of emotional reactions arising from the anticipation of a real or imagined threat to self." (p. 25). Anxiety is not necessarily pathologic, for example it can be adaptive in its facilitation of avoiding danger (Beesdo-Baum & Knappe, 2012), however the extent to which anxiety interferes with daily functioning determines whether an individual is diagnosed with an anxiety disorder. Diagnostic criteria for anxiety disorders are defined in the DSM-5 (APA, 2013) and the ICD-10 (World Health Organization, 1992). Common clinical features in children and adolescents can include extensive anxiety, fearful responses to objects or situations, difficulty separating from parents, extreme avoidance, somatic and physiological symptoms, troubling thoughts, problems concentrating, sleep problems, irritability, and tiredness/fatigue (Beesdo-Baum & Knappe, 2012; Reaven, 2009).

While sometimes interpreted as the same, there is a noticeable difference between fear and anxiety (Silverman & Field, 2011). While fear can be described as an avoidance or discomfort reaction to specific stimuli that poses threat to well-being (e.g., snakes or flying), anxiety can be typified by a more dispersed reaction to a more generalized worry (e.g., fretting about the future) (Silverman & Field, 2011). The types of stimuli that elicit fear may change across the lifespan and these changes correspond to developments in the individual's cognitive and social competencies and concerns (Carr, 2006).

Anxiety is often conceptualised by physiological, behavioural, and cognitive responses (Fonseca & Perrin, 2011). In the occurrence of anxiety-provoking stimulus or situations, physiological symptoms include somatic complaints such as nausea, headaches, sweating, and muscle tension (Fonseca & Perrin, 2011; Ozsivadjian, Knott, & Magiati, 2012). Cognitive symptoms often reflect catastrophic predictions and expectations about failure to cope. The behavioural response may result in escaping or avoiding situations, "freezing", and/or experiencing distress when enduring an anxiety-producing situation. Additional behavioural responses may include agitation or restlessness (e.g., pacing), hypervigilance, clinginess with parent, checking or urgently demanding assistance (Fonseca & Perrin, 2011).

1.3.2 Anxiety prevalence in the general population. While noticeably behind adult anxiety research in terms of assessment and treatment, the past 30 years has seen considerable growth in child and adolescent anxiety research (Mohr & Schneider,

2013). Approximately 20% of young people score beyond the clinical cut-offs for one or more anxiety disorders (most frequently occurring are separation anxiety disorder, social phobia and specific phobia), with relatively equal prevalence among boys and girls (Rockhill et al., 2010). Research has shown that anxiety emerging prior to 18 years of age is likely to persist into adulthood (Verhulst, van der Ende, & Koot, 1996) with an increased risk in regards to future depression, reduced educational outcomes, problems with relating to both family and peers, low engagement with extracurricular activities, substance abuse and subsequent adult mental health problems (Bennett et al., 2013; Mohr & Schneider, 2013; Silverman & Field, 2011).

1.4 Anxiety in Adolescents with ASD

1.4.1 Diagnostic overlap. Anxiety is a common element associated with heightened impairment above and beyond inherent ASD symptomology (Nadeau et al., 2013). For people with ASD, the assessment of anxiety disorders is complicated, with comorbid anxiety often unrecognised or mislabelled (Kerns et al., 2015). The main challenge lies in differentiating comorbid anxiety from the characteristics of ASD (Kerns et al., 2015) where diagnostic overshadowing—the inclination to override co-occurring psychiatric symptoms when there is a predetermined disability diagnosis – can occur (Mason & Scior, 2004). Therefore, it is important for conceptualisation and treatment to establish whether presenting psychiatric problems derive from core or secondary ASD deficits or whether they represent true psychiatric symptoms (MacNeil, Lopes, & Minnes, 2009). Symptoms that may be overlapping between ASD and anxiety include social awkwardness and avoidance, communication difficulties, obsessive and ritualised behaviour, and problems with reciprocating emotions (Kerns et al., 2015). Certainly, Wood & Gadow (2010) have questioned whether the core symptoms of ASD are misidentified as co-occurring anxiety and consequently, they have proposed a guideline for assessing comorbidity (Wood & Gadow, 2010). In addition, they suggest that the extreme stress deriving from ASD may put individuals with ASD at risk of anxiety.

Due to the diagnostic overlap, Kerns and Kendall (2012) conducted a review of literature in this area. Across studies, including international populations, children, adolescents and adults with varying ASD diagnoses, and numerous measures employed (e.g., Child and Adolescent Psychiatric Assessment, Social Anxiety Scale for Adolescents, Child Behavior Checklist), anxiety symptomology was not substantiated for all of their participants. These authors deduced that if anxiety were a

core feature of ASD then it would occur across ASD subtypes. In addition, they found that differences in behavioural and familial presentations of ASD and anxiety problems indicates independence of these symptomologies (Kerns & Kendall, 2012). Despite the scarcity of anxiety measures specific to ASD, these authors concluded that rather than being an integral part of ASD, it is more probable that it co-occurs with ASD. Unlike comorbidity, the term concurrent or co-occurring anxiety is used to emphasise that ASD and anxiety are not necessarily separate entities and therefore may fit well with the diagnostic overlap present in this complex population (Kerns & Kendall, 2012).

1.4.2 Prevalence and type of anxiety disorders in ASD. Recent research has revealed that children and adolescents with ASDs have significantly higher anxiety levels than their typically developing peers (Farrugia & Hudson, 2006; Gillott et al., 2001; van Steensel, Bogels, & Perrin, 2011), higher anxiety than adolescents with conduct disorder, (Green & Ben-Sasson, 2010) and individuals with ASD and an intellectual disability (Muris, Steerneman, Merckelbach, Holdrinet, & Meesters, 1998), and equivalent anxiety levels to non-ASD adolescents with an anxiety disorder (Farrugia & Hudson, 2006). In fact, multiple studies report prevalence rates to range between 11 and 84%, and averaging approximately 40-55% (Gillott et al., 2001; Peter Muris et al., 1998; White et al., 2009). These figures are far higher than those derived from studies on the prevalence of anxiety disorders in the general paediatric population (5-10%, see Costello, Egger, & Angold, 2005; 31.9%, see Merikangas et al., 2010).

While the majority of children and adolescents with ASD meet the criteria for more than one disorder, the most commonly diagnosed anxiety disorders are specific phobia (30-44%), generalised anxiety disorder (15-35%), separation anxiety disorder (9-38 %), social phobia (17-30%), agoraphobia (1-17%), and panic disorder (1-2 %) (Rudy, Lewin, & Storch, 2013). Presently, developmental issues surrounding anxiety in ASD youth are not well understood (Davis et al., 2011) however, findings from some studies suggest that anxiety may become more acute with age (Wood et al., 2014; Lecavalier, 2006; White et al., 2010). In addition, specific phobias are more prominent in children with ASD, whereas an emergence of disorders such as OCD, social phobia, and panic disorder are more common during adolescence (Bellini, 2006; Rudy et al., 2013; White et al., 2009). Furthermore and similar to research findings on children, older adolescents with ASD have been found to have higher levels of anxiety than their typically developing peers (Bellini, 2006; Farrugia & Hudson, 2006; Kim, Szatmari, Bryson, Streiner, & Wilson, 2000). This is not surprising given that simultaneous

social, emotional, physical and hormonal changes are taking place during adolescence (White, Oswald, Ollendick, & Scahill, 2009). Compounded by core social, communicative, and cognitive deficits, the adolescent with ASD is often confronted with challenges across their school, home, and social life (Khouzam, El-Gabalawi, Pirwani, & Priest, 2004). The accumulation of these factors is likely to intensify anxiety levels and consequently affect adjustment at high school, where change is constant and social relationships are difficult to navigate. As anxiety increases, the adolescent may become more withdrawn, engage more often in ritualised or repetitive behaviours, and become irritable and aggressive (Tantam, 2003). It is therefore imperative to study anxiety from a developmental perspective, as an array of factors may impede an adolescent's functioning (Farrugia & Hudson, 2006).

A study by Kuusikko et al. (2008) compared social anxiety and internalising symptoms in 54 ASD adolescents and a community sample of 305 adolescents and found that those who had ASD scored higher on all outcome measures (self and parental reports) than the community adolescent participants. As age increased, adolescents with ASD tended to engage in more avoidant behaviour and social anxiety was more common. In contrast, in the community sample, behavioural avoidance decreased with age. Other studies which have found individuals with comorbid ASD and anxiety are at increased risk for displaying externalising behaviour problems (Davis et al., 2011), social avoidance (Gillott et al., 2001; Rudy et al., 2013), problems initiating and maintaining peer relationships, sleep difficulties, disruptions in family functioning and decreased overall quality of life (Higgins, Bailey, & Pearce, 2005; Rao & Beidel, 2009; Rudy et al., 2013; van Steensel, Bögels, & Dirksen, 2012).

If left untreated, adolescents are at risk of severe educational difficulties, problems gaining meaningful employment, minimal adult relationships, substance use difficulties, and additional psychiatric symptomology (Howlin & Moss, 2012; Reaven, 2009; Reaven, Blakely-Smith, Leuthe, Moody, & Hepburn, 2012; Tantam, 1991; Velting, Olivia, Setzer, & Albano, 2004). The more established behaviour patterns become, the more difficult they are to change (Howlin, 2000), and the more likely they are to become chronic, and continue into adulthood (Binnie & Blainey, 2013; Buck et al., 2014; Joshi et al., 2013).

While further research is needed to determine the developmental effects of anxiety in adolescents with ASD, it is clear that anxiety can be invasive, may increase in severity with age, and has the potential to intensify social and functional impairments (Kuusikko et al., 2008; White et al., 2015). With the growing prevalence

of children diagnosed with ASD, along with the high incidence of comorbid anxiety, research focusing on the management of anxiety among this population is pertinent.

1.4.3 Nature and presentation of anxiety in individuals with ASD. While lacking consensus, there is some evidence to suggest that the presence of anxiety in adolescents with ASD is directly associated with age, functioning status, communication skills, and intelligence (Rudy, Lewin, & Storch, 2013).

Despite limited research on the triggers and presentation of anxiety in youth with ASD, emerging evidence suggests that triggers are markedly different than those associated with typically developing youth (Ozsivadjian et al., 2012). In an attempt to isolate factors that underpin anxiety in this population, an exploratory study by Ozsivadjian et al., (2012) used focus groups to identify common triggers across youth with ASD and anxiety. Triggers included social or language-related difficulties, situational change or change in routines, sensory issues, specific fears, obsessions, and high expectations in performance or organization. School related anxieties were pervasive across all anxiety groups. In addition, these authors identified five common categories for the manner in which anxiety expresses itself in youth with ASD: challenging behaviours/ "meltdowns" (verbally and physically aggressive behaviour were frequently mentioned); avoidance/ escape; hyperactivity/ heightened arousal; sensory behaviours; and increased repetitive behaviours; with challenging behaviours being the most pervasive. Whilst some presentations mirrored those of typically developing youth (e.g., avoidance/ escape, increased arousal, meltdowns), the expression of anxiety was found to be unique at times to those with ASD (e.g., language and sensory related, rigidity in routines, and heightened challenging behaviours). These expressions of anxiety may heighten core ASD difficulties while highlighting the challenges associated with interacting appropriately in social situations, repetitive questioning, ritualised behaviour and overall functioning (Reaven, Blakely-Smith, Leuthe, et al., 2012).

Parents in a study by Ozsivadjian et al. (2012) noticed anxiety less pre-emptively (for example, before situational of behavioural expressions occur) and more when it was expressed in the form of maladaptive coping behaviours. In addition, they often attributed behaviours to the core deficits of ASD (e.g., rigidity) rather than to symptoms of anxiety. The difficulties inherent in ASD, particularly in understanding, identifying and expressing feelings, and in using pragmatic language, may well explain why behavioural forms of coping in times of high distress are employed over verbal expressions of anxiety (Ozsivadjian et al., 2012). While typically developing anxious

children may experience some difficulty in expressing their feelings, for youth with ASD, the expression of anxiety is likely to be quite different due to the severe social and communication challenges they face. Developing a deeper understanding about the factors that trigger and maintain anxiety in those with ASD will be valuable in determining autism-specific assessment, treatment, and implementation of interventions for anxiety in this population.

1.5 Risk Factors for Anxiety

Literature in the area of anxiety in typically developing children and adolescents has identified numerous factors that may contribute to the development and maintenance of anxiety symptoms. There is no reason to suggest that these etiological factors are not shared by those with ASD and co-occurring anxiety. For example, genetic influences, temperament, parenting style and parental anxiety, cognitive biases, social learning paradigms and negative or traumatic life events all have the potential to influence symptom development (Reaven & Blakeley-Smith, 2013). There may however, be factors contributing to the development of anxiety symptoms that are unique to youth with ASD and that need to be considered when designing interventions for this population. The core deficits of ASD have the potential to increase anxiety and it may be that some of these relationships are bidirectional (Mazefsky & Herrington, 2014).

1.5.1 Family history of anxiety and depression. A strong familial psychopathology has been determined in family and epidemiologic studies. Family studies have linked ASD and anxiety disorders showing that anxiety disorders amongst people with ASD and their family members occur more frequently than in family members of typically developing youth who have other developmental problems, such as Down Syndrome (see Bolton, Pickles, Murphy, & Rutter, 1998; Kerns & Kendall, 2012). Furthermore, mother's anxiety levels have been found to be directly associated with increased anxiety in children with ASD (Mazefsky, Conner, & Oswald, 2010); higher levels of restrictive behaviours in young people with ASD is significantly associated with OCD traits in parents compared to ASD youth with lower restrictive behaviours (Hollander, King, Delaney, Smith, & Silverman, 2003; Kerns & Kendall, 2012); and having psychiatric difficulties, other than ASD, amongst family members was a predictor of psychiatric problems, including anxiety, in ASD participants (Gadow, DeVincent, & Schneider, 2008; Kerns & Kendall, 2012). This latter finding

gives sustenance to the notion that anxiety symptomology may well be a separate entity to ASD. While emerging, there has been an absence of literature on the role that familial mental health may play in the mental health of young people with ASD. It may be that researchers have bypassed this topic due to the early work in this field that blamed mothers for their child's ASD symptomology (Reaven & Blakeley-smith, 2013).

1.5.2 Cognitive differences.

It has been proposed that the core features of ASD are underpinned by cognitive differences. A number of cognitive theories exploring the mechanisms underlying these differences have been proposed (Syriopoulou Delli, Varvaris, & Geronta, 2017). One such model is the theory of mind hypothesis, which, together with the theory of weak central coherence, may explain many of the difficulties and abilities associated with ASD. It has been argued however, that the repetitive behaviours and restricted interests observed in individuals with ASD may be best explained by a third cognitive theory, that of executive dysfunction (Brunsdon & Happé, 2014).

Having an under-developed theory of mind, individuals with ASD may have difficulties in deciphering the thoughts and feelings of other people, may have difficulty with empathising and often feel confused by other people's behaviour (Baron-Cohen, 1989; Frith, 2012). Neuroimaging studies have now illustrated that individuals with Asperger's disorder show significantly less activation in the brain regions (medial prefrontal cortex, superior temporal sulcus at the temporoparietal junction and temporal poles) that are important for "mentalising" in neurotypical individuals (Castelli, Frith, Happé, & Frith, 2002). The predominant view in the developmental literature is that, although somewhat complicated by developmental factors and type of theory of mind task, individuals with ASD demonstrate an apparent inability to think about thought.

According to the theory of weak central coherence theory, difficulty occurs in the operation of central systems that are normally responsible for integrating individual pieces of information to establish meaning. For individuals with ASD this piecemeal approach to stimulus processing means that they are extraordinarily capable of attending to details, but demonstrate considerable challenges perceiving or understanding the overall picture, or "gist" (Attwood, 2007; Plaisted, Saksida, Alcántara, & Weisblatt, 2003). Proponents of this theory argue that other ASD features such as hyper- or hypo-arousal to sensory stimuli, extreme sensitivity to small changes in the environment, and circumscribed interests can also be explained by weak central

coherence (Hoy, Hatton, & Hare, 2004). The rigid thinking style inherent in this population may derive from weak central coherence, which inhibits their ability to learn from mistakes, cope with being wrong, and to adapt their behaviour to meet the demands of their environment (Burnette et al., 2005). Some studies however have failed to demonstrate differences in visual processing tasks between individuals that have ASD and those without ASD and therefore further research is required to substantiate this theory (Brian & Bryson, 1996; Ozonoff, Pennington, & Rogers, 1991). For example, Syriopoulou Delli, Varvaris, and Geronta (2017) recently found children with ASD performed similarly to typically developing children in terms of local processing ability with these authors suggesting that differences may be a preferred personal processing style as opposed to a universal feature of ASD.

When compared to children and adults with other developmental disabilities (e.g., ADHD, conduct disorder and Tourette syndrome), executive function abilities in children and adults with ASD have been found to be more severely impaired (Bennetto, Pennington, & Rogers, 1996; Hollocks, Ozsivadjian, Matthews, Howlin, & Simonoff, 2013; Sally Ozonoff & Miller, 1995). These abilities include functions such as planning, working memory, impulse control, inhibition, self-monitoring, generativity and mental flexibility (Hollocks et al., 2014). It has been proposed that executive impairment reflects abnormalities in the frontal lobe and is accountable for repetitive and restricted behaviour in ASD (Happe, 1999). The literature on executive dysfunction as a causal factor in autism spectrum disorders is controversial however, it has been demonstrated that executive function deficits do play a role in the social and cognitive deficits observed in school-age children with ASD (Griffith, Pennington, Wehner, & Rogers, 1999; Ozonoff, Rogers, & Pennington, 1991).

Currently, there is a lack of research exploring the manner in which cognitive deficits may contribute to the development or maintenance of anxiety symptoms in adolescents with ASD (Farrugia & Hudson, 2006). Research is needed to explore these cognitive processing styles, often absent in typically developing individuals, to determine how they may be contributing to, or moderating, the possible atypical, or distinct, symptoms of anxiety in those with ASD.

1.5.2 Sensory over-responsivity. Individuals with ASD are often reported to have sensory over-responsivity, that is, they may react strongly and negatively and/ or develop fears to certain stimuli including visual and auditory information, touch, tastes and smells (Kerns & Kendall, 2012). For example, some children have a low tolerance to tags in clothing or seams in socks, or dislike being touched unexpectedly (Green &

Ben-Sasson, 2010). Other children may develop a specific phobia (e.g., balloons popping or thunderstorms) due to their sensitivity to noise. Research indicates that approximately 56-70% of children with ASD experience sensory over-responsivity, compared to 10-17% in the general population (Baranek, David, Poe, Stone, & Watson, 2006). It has been suggested that an overreaction to aversive sensory stimuli among individuals with ASD causes them to pay attention to, and have difficulty disengaging from such stimuli (Liss, Saulnier, Fein, & Kinsbourne, 2006). The relationship between sensory over-responsivity and the possible development and maintenance of anxiety is not yet understood. Further research is required in this important area.

1.5.3 Overactive fear response. Emerging evidence suggests that individuals with ASD may have a neurobiological risk for an overactive fear response. Some studies have found that youth with ASD have larger amygdala volumes than their typically developing peers. This is of interest because amygdala volume is positively related to severity of anxiety and social-communication problems (Green et al., 2013).

1.5.4 Social functioning. It has been proposed that the atypical social behaviour of individuals with ASD may actually be a primary contributing factor in the development of anxiety itself, which in turn, may exacerbate an adolescent's social impairment (Cappadocia & Weiss, 2011; White, Bray, & Ollendick, 2012). In the past, the social deficits of ASD have been believed to arise from low levels of social motivation. Emergent information from neuroimaging, psychophysiological, and behavioural studies however, are now associating this inherent social disability with heightened arousal and avoidance of social situations for certain young people with ASD (Dalton, Nacewicz, Alexander, & Davidson, 2007; White et al., 2013). Particularly in response to social-emotional information, heightened arousal may interfere with accurately interpreting social cues and appropriate reactions to others, suggesting that anxiety itself may be contributing to the social disability present in ASD (Kerns & Kendall, 2012; White et al., 2013). For adolescents, a lack of peer relationships, combined with an inability to comprehend many social situations and impaired functioning in reciprocal interactions, may substantially increase anxiety levels (Tse, Strulovitch, Tagalakis, Meng, & Fombonne, 2007). Social anxiety can lead to fear and avoidance of social situations, providing limited opportunities to practice important social skills (Reaven, Blakely-Smith, Leuthe, et al., 2012; Rudy et al., 2013; White et al., 2009) and affect academic success (Rotheram-Fuller &

MacMullen, 2011). Currently however, the question of whether a bidirectional relationship exists between anxiety and social functioning, or whether one actually mediates the other, remains unanswered (White et al., 2010).

1.5.5 Resistance to change. Individuals with ASD commonly experience change and transition related anxiety. Typically developing children who are assessed as behaviourally inhibited, which includes finding adjustment to new situations difficult, are more prone to developing anxiety disorders (Muris & Ollendick, 2005). In a study of 31 adolescents with ASD, one-third were found to meet the criteria for transition-related anxiety on the Autism Comorbidity Interview (ACI; Lainhart, Leyfer, & Folstein, 2003). While this sample was small it does suggest that resistance to change may present a risk for anxiety (Mazefsky & Herrington, 2014). In confirmation of this, Rodgers, Glod, Connolly, and McConachie (2012) compared adolescents with ASD with a diagnosis of anxiety and those without, and found that those who experienced more resistance to change had higher levels of anxiety. Of interest, resistance to change was not correlated with anxiety in the low-anxiety group (Kerns & Kendall, 2012).

1.5.6 Repetitive behaviours. Perseverative symptoms of ASD have been found to more strongly correlate with anxiety then social or communication symptoms (Guttmann-Steinmetz, & Crowell, 2010). It is however, unclear as to whether repetitive behaviours increased due to the presence of anxiety or vice versa. Indeed, while distress rather than anxiety symptoms were investigated by Mazefsky, McPartland, Gastgeb, and Minshew (2013) repetitive behaviours were observed to rise in times of distress and function as way of coping. While research is needed, similar to the relationship between social functioning and anxiety, it is probable that a bidirectional relationship between repetitive behaviours and anxiety may exist (Kerns & Kendall, 2012; Mazefsky et al., 2014).

1.5.7 Attention Deficit Hyperactivity Disorder (ADHD). Prevalence of ADHD in the ASD population is high and ranges between 17 and 83% (Frazier et al., 2001; Hanson, Hanson, Ramsey, & Glymour, 2013; Leyfer et al., 2006; Yoshida & Uchiyama, 2004). Researchers in this area have discovered that children with a diagnosis of ADHD demonstrate more ASD symptoms in comparison to typically developing children, and equally, that children diagnosed with ADHD have more ASD symptomology than their peers of typical development (Hattori et al., 2006). Limited research exists on the impact that ADHD symptoms have on treatment outcomes for

youth with ASD and anxiety. However, Antshel and colleagues (2011) provided a social skills intervention to 83 children (*M* = 9.5 years) and based on parent-reports, children with ASD and children with ASD and comorbid anxiety, improved in social skills. However, children with ASD and comorbid ADHD failed to improve. These latter findings confirm those previous that demonstrated limited treatment outcomes when social skills interventions are employed for children with ADHD (Antshel et al., 2011; Kavale & Forness, 1996; Kolko, Loar, & Sturnick, 1990). Whether ADHD negatively moderates anxiety treatment efficacy is yet to be studied.

1.6 Family Quality of Life

Research findings have demonstrated that parents of children and adolescents with ASD experience increased stress, anxiety and depression, and family problems when likened to parents of typically developing children or children with other disabilities (Abbeduto et al., 2004; Bouma & Schweitzer, 1990; Donovan, 1988; Hartley, Seltzer, Head, & Abbeduto, 2012; Kerns et al., 2015; Lai, Goh, Oei, & Sung, 2015; Lee, Harrington, Louise, & Newschaffer, 2008; Pozo, Sarriá, & Brioso, 2014; Smith, Greenberg, & Seltzer, 2012). Having a child with an additional anxiety diagnosis can elevate levels of family distress (Kerns et al., 2015) and heighten parent accommodation. Here, parents of children with anxiety problems frequently use their time and energy to accommodate their child's symptoms, and this has been linked with elevated levels of parental stress and psychiatric symptomology (Kerns et al., 2015). Parents may adjust their routines to accommodate their child's "rules" for different tasks and unique preferences (Ausderau & Juarez, 2013). In addition, parents may reduce demands placed upon their child parents avoid participating in situations that may cause their child distress and instead plan activities in order to decrease the possibility of challenging behaviour (O'Nions, Happé, Evers, Boonen, & Noens, 2018). In addition, parents of children with ASD have been reported to spend an excessive amount of time, with little impact, attempting to reassure their adolescent in response to anxiety symptoms, such as, their intense fears concerning an event, or their refusal to attend school (White et al., 2009). Positively, a preliminary research finding indicates that utilising CBT to reduce anxiety in young people with ASD results in a significant reduction in parental stress (Ooi et al., 2008).

The culminating stress placed upon families with a child with ASD is likely to negatively impact upon a family's quality of life (Chalfant et al., 2007; Ooi et al., 2008). While there has been a growth in research exploring family quality of life of

families with a child with a disability in general, research investigating the family quality of life for parents with a child with ASD is still in its infancy (Eapen, Crncec, Walter, & Tay, 2014; Lee, Harrington, Louise, & Newschaffer, 2008). Nonetheless, family quality of life has been identified as a likely mediator of psychological adjustment and treatment outcome for people with ASD, and is therefore an important component to consider in treatment planning and evaluation (Eapen et al., 2014).

1. Conclusion

This chapter reviewed the historical and diagnostic journey of ASD and its prevalence, in addition to examining the relationship between anxiety and ASD. In particular, the atypical nature in which anxiety may manifest, its prevalence, developmental trajectory, functional impairment, risk factors and impact on adult outcomes within this population.

Anxiety within typically developing youth has been extensively studied. Despite the high prevalence of anxiety amongst youth with ASD, the overlap of symptomology between ASD and anxiety has contributed to the dearth of research into anxiety assessment, prevalence, presentation, and treatment for individuals with ASD (Kerns et al., 2015; White et al., 2015). While there has been a shift in attention in recent years, this has for the most part, been limited to children with ASD (Sung et al., 2011; White et al., 2013). The inadequate study of anxiety in adolescents with ASD is noteworthy given that anxiety has been postulated to present more acutely for this age group. Furthermore, the presence of these symptoms at this time may be particularly impairing, placing individuals at risk for the development of other psychiatric disorders, limited social support, education and employment difficulties (Howlin, 2000). The impact of comorbid anxiety has additionally been found to contribute to increased internalising and externalising behaviour, high levels of parental stress and diminished family of quality of life (Kerns et al., 2015).

There are a number of etiological factors that may be unique to the development and maintenance of anxiety in youth with ASD. For example, there are elevated rates of familial psychopathology in families where there is an ASD child or adolescent, increased sensory dysfunction, possible overactive fear response, along with core ASD deficits. Our understanding of how these processes may underlie or increase anxiety is limited and further research is required. Due to the atypical pathway in which anxiety manifests, it has been suggested that assessment measures and treatment protocols aimed at typically developing youth may not be appropriate or

effective in assessing and reducing anxiety in individuals with ASD (White et al., 2015). The following chapter will explore the problems encountered with anxiety measures standardised to typically developing youth and review the literature on treatments targeted at reducing anxiety within this unique population.

Chapter 2: Interventions for Anxiety in Adolescents with ASD

2.1 Introduction

Researchers have provided strong support for the treatment of childhood anxiety disorders in typically developing children, comprising of cognitive behavioural therapies, selective serotonin reuptake inhibitors (SSRIs), or a combination of both (Vasa et al., 2014; Walkup et al., 2008). In contrast, empirically supported anxiety-based treatments for youth with ASD are limited, despite the high prevalence of anxiety and subsequent negative effect on quality of life (Lang, Regester, Lauderdale, Ashbaugh, & Haring, 2010b; Selles & Storch, 2013). Outlined below are a number of factors that have contributed to the lack of evidence-based treatment studies in this area.

Individuals with ASD are often clinically unique and challenging in their presentation which is likely to hinder therapeutic engagement and successful treatment outcomes (Selles & Storch, 2013). For example, some of the barriers to treatment may include negative or dysregulated emotional systems, difficulties in social, attention, and adaptive skills, cognitive and communication deficits, comorbidity of disruptive behaviour disorders, narrow interests and poor insight, lack of motivation and abstract thinking ability, and difficulty in skill generalisation (Kerns et al., 2015; Ozsivadjian, Knott, & Magiati, 2012; Scattone & Mong, 2013). It is not surprising that professionals may feel perplexed as to how best meet their needs (Selles et al., 2014; Wood et al., 2009). In addition, the idiosyncratic nature of ASD denotes that individuals often differ clinically from one another. For example, where aggression may be the most pressing clinical issue for one individual with ASD, hyperactivity may be the main presenting concern for another (McLeod, Wood, & Klebanoff, 2015). As such, manualised programs targeting a particular type of symptom, such as anxiety, may or may not be a good fit for an individual presenting for intervention (McLeod et al., 2015). Therefore, anxiety strategies that have been successful in typically developing populations may lack effectiveness and need to be modified for individuals with ASD.

In this chapter, an overview of interventions aimed at reducing anxiety in youth with ASD will be provided. It is well documented that specific barriers to participation and engagement in therapy are common for this client group (Ozsivadjian & Knott, 2011; Scattone & Mong, 2013). These will be explored, along with modifications and adaptations to better address the unique characteristics of these individuals. Briefly, research on the efficacy of CBT for typically developing youth will be discussed, prior

to examining empirical evidence of CBT for anxiety in ASD youth, with a particular focus on group-based CBT.

2.2 Assessment

Currently, assessment measures developed and standardised for youth with ASD are lacking, with no commercially available anxiety measures developed specifically for people with ASD (White, Schry, & Maddox, 2012). This creates problems when assessing and interpreting changes and treatment response in intervention research (Ozsivadjian & Knott, 2011; Ozsivadjian et al., 2012). Assessment can also aid in identifying when treatment delivery may require modifications (Mazefsky & White, 2013). For these reasons, in conjunction with being aware of symptom overlap, researchers in this field are acknowledging that caution needs to be taken when using measures that lack information on psychometric properties for children with ASD (Mazefsky & White, 2013; McLeod et al., 2015). While there exists evidence-based assessment tools to accurately measure the core deficits of ASD, fewer assessment tools exist for co-occurring clinical problems frequently observed in those with ASD, such as anxiety (McLeod et al., 2015).

In the general clinical and psychiatric population, while a multi-informant approach to assessment is ideal, agreement among parents and children has often been reported to be reasonably low (De Los Reyes & Kazdin, 2005; Reuterskiöld, Öst, & Ollendick, 2008). Many researchers have replicated the finding that discrepancies often exist among the ratings of different informants, however they have failed to explain why these differences consistently occur (De Los Reyes & Kazdin, 2005). Within ASD research, this discrepancy between parent-and child-report measures may be even more distinct (Lopata et al., 2010; Mazefsky, Kao, & Oswald, 2011). For example, low agreement occurred between parent and child self-reports on the Autism Comorbidity Interview—Present and Lifetime (Mazefsky et al., 2011). Similarly, in a sample of 8-13 year old children with and without ASD, May and colleagues (2015) found greater agreement between parent and child reports using the Spence Children's Anxiety Scale (SCAS) for the parent and children in the typically developing group compared to those in the ASD group. Conversely, other studies have demonstrated relatively good parent-child agreement among various anxiety measures (Blakely-Smith, Reaven, Ridge, & Hepburn, 2012; Burrows et al., 2018; Farrugia & Hudson, 2006; Magiati, Chan, Tan, & Poon, 2014; Ozsivadjian, Hibberd, & Hollocks, 2014). For example, moderate-to-strong agreement was found among parent and child ASD

dyads on a number of domains in the Screen for Child Anxiety Related Emotional Disorders (SCARED; Blakely-Smith et al., 2012). There was greater agreement between parent and child dyads in the areas of Separation, School Avoidance, and Total Anxiety when children demonstrated greater verbal ability (Blakely-Smith et al., 2012).

These researchers, along with others, have found that parents rate their child's anxiety symptoms or social worries more highly than their child's reports (Blakely-Smith et al., 2012; Gillott et al., 2001; Christopher Lopata et al., 2010; Russell & Sofronoff, 2005; van Steensel, Deutschman, & Bögels, 2012). In contrast, with a slightly older population of adolescents with ASD, good parent-teen agreement has been found (Farrugia & Hudson, 2006; Hurtig et al., 2009). For example, Farrugia and Hudson (2006) revealed substantial parent-teen agreement on the Total Anxiety Scores on the SCAS ($r = .697$). These findings may suggest that accurate self-reporting is positively related to development. However, White, Schry, and Maddox, (2012) used the child and parent versions of the Multidimensional Anxiety Scale for Children with 12-17 year olds with ASD and found them not to be significantly correlated. The authors questioned the validity of self-report measures of the adolescents in their study given that only 23% self-reported clinically elevated levels of anxiety despite all being diagnosed with an anxiety disorder.

It may be that communication and cognitive deficits, impaired introspection and emotion identification, and impaired verbal expression, aid difficulties in accurate self-reporting (Blakely-Smith et al., 2012; Leyfer et al., 2006). Nevertheless, it has been proposed that self-reports should be obtained from youth with ASD where possible since they have the potential to provide valuable information. This was confirmed in a study which found that self-reports by adolescents with ASD had equal or better internal reliability scores when compared with non-ASD standardisation samples, suggesting that the adolescents comprehended the questions and were consistent in their responses (Mazefsky et al., 2011).

In contrast, a number of studies focusing on anxiety or depression have postulated that youth with ASD commonly underreport their symptoms (Mazefsky et al., 2011; Russell & Sofronoff, 2005; White, Schry, & Maddox, 2012). Underreporting of symptoms may be useful clinical information as it may indicate a need to increase self-awareness and to infer feelings about oneself and others. In light of inconclusive evidence, the research field refrains from recommending self- or parent- report questionnaires for use with children with ASD to measure anxiety or depression.

However, some self-report measures have been used in ASD samples such as the Screen for Child Anxiety Related Emotional Disorders (SCARED; Birmaher et al., 1997), the Mood and Feelings Questionnaire (MFQ; Angold & Costello, 1987) and the Spence Children's Anxiety Scale (SCAS; Spence, 1998). For best practice measures in assessing anxiety symptomology, it has been suggested that researchers use multiple sources of information, such as parent and child interviews, reliable and valid rating scales, and behavioural observations with this population (White and Roberson-Nay, 2009).

2.3 Types of Interventions

Research investigating anxiety-based treatments in the ASD population is still emerging. Currently, for school-aged children and adolescents with ASD, no psychosocial or medication treatments for anxiety have been accepted as meeting the American Psychological Association (APA) guidelines for efficacy (Chambless & Hollon, 1998; Kerns et al., 2016). A review of psychopharmacological and non-psychopharmacological treatments for anxiety in youth with ASD follows.

2.3.1 Psychopharmacological interventions. For typically developing youth, the first-line psychopharmacological treatment of anxiety disorders is SSRIs (Selles & Storch, 2013). Currently, no psychotropic drugs are approved to treat anxiety in youth with ASD, and little is known about patterns of pharmacological treatment in the ASD population and associated co-morbidities (Murray et al., 2014). While typically safe and well tolerated, for youth with ASD, SSRIs have been linked to possible side effects with an elevated risk of an adverse reaction when compared to typically developing populations (Selles & Storch, 2013; West, Brunssen, & Waldrop, 2009). Reported side effects include physical (e.g., headache, nausea, diarrhoea) and behavioural symptoms (e.g., agitation, aggression, hyperactivity and suicide ideation; King, Hollander, & Sikich, 2009; McDougle, Kresch, & Posey, 2000; West et al., 2009). Similar to those of typical development, youth with ASD share a vulnerability to behavioural activation with certain SSRIs, such as impulsivity, behavioural activation, heightened activity level or disinhibition without manic symptoms (King et al., 2009; Reinblatt et al., 2009; Selles & Storch, 2013). With the high rates of children and

adolescents with ASD experiencing psychiatric comorbidities, there is an urgent need for future research to focus on anxiety treatment for this client population.

2.3.2 Cognitive Behavioural Therapy theory. Cognitive behavioural therapy (CBT) is a brief, structured form of psychotherapy based on empirical evidence and theory from learning and cognition designed to create changes in thinking, feeling, and behaviour (Anderson & Morris, 2006; Scarpa, White, & Attwood, 2013). The central tenet of cognitive therapy is that a person's cognition is a mediator between stimuli (an event) and emotions (Beck, 2005). Therefore, a stimulus elicits a thought, belief, evaluation, or judgment that elicits an emotion. Important here is that emotions are not caused as a direct result of a stimulus. It is the manner in which a person appraises the stimulus that elicits an emotional reaction (O'Donovan, Casey, Veen, & Boschen, 2013). Anxiety disorders often arise from multifaceted sets of negative beliefs concerning the self or the outside world (Beck, Emery, & Greenberg, 1985). They are triggered by particular feared stimuli or situations ascending from threat-oriented cognitive schemas. Since such schemas are often developed during the course of threatening and stressful experiences, assumptions are made regarding the perilous nature of certain situations or events, for example, "I can be bitten by a shark in the ocean, therefore I must never swim in the ocean." Here, schemas envelop cognitive distortions whereby safety-related situations may be minimised and threat-related adverse situations are maximised (Beck, Emery, & Greenberg, 1985). In addition, core beliefs can elicit maladaptive compensatory behaviours (O'Donovan et al., 2013). For example, an individual may believe that others do not like them and this may lead to social withdrawal. With social opportunities avoided, their belief that others do not like them is not challenged and is likely to be reinforced.

Cognitive behavioural therapy (CBT) helps individuals to identify their distressing feelings and thoughts and to challenge their assumptions about anxiety-provoking events or stimuli (Beck et al., 1985). During CBT, cognitions are monitored and individuals evaluate how realistic their thoughts are. Beck's (1985) theory pertains that dysfunctional behaviour arises from dysfunctional thinking and therefore by implementing changes in thinking, behaviour change is likely to occur. Since CBT focuses on cognitive restructuring and psychoeducation, somatic management skills and behavioural components (such as graded exposure), a reduction in anxiety is often the result (Rapee et al., 2009). Figure 1 shows how CBT assists individuals to identify and evaluate their automatic thoughts and the association this has on behaviour.

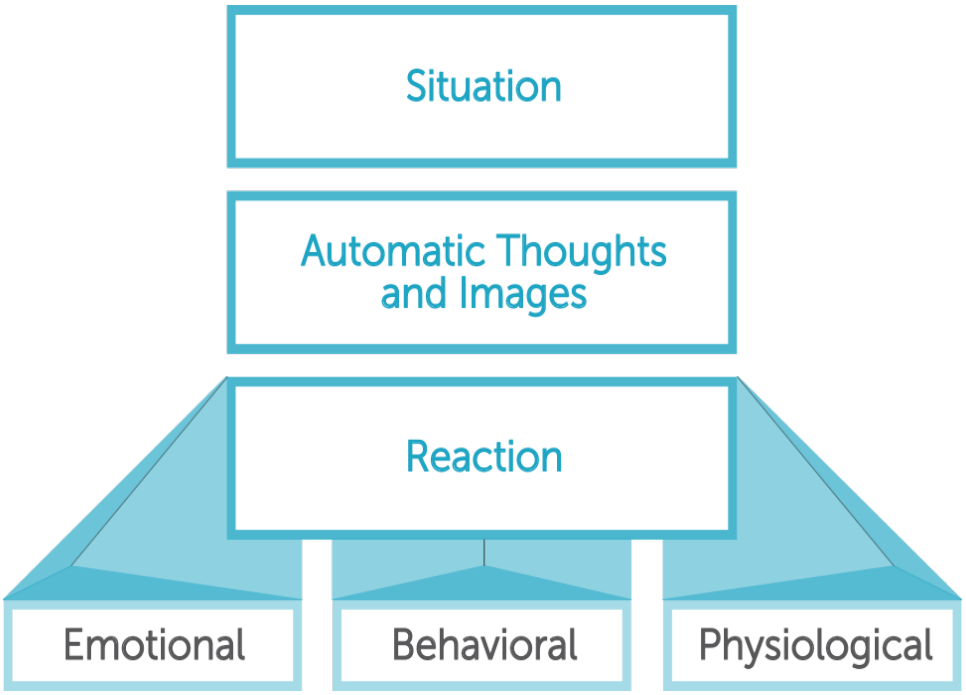

Figure 1.The Cognitive Model (Beck Institute for Cognitive Behavior Therapy, 2016).

Hundreds of empirically-based studies have refined, enhanced and assessed CBT over time (Clark & Beck, 2010). Currently, it is viewed as the treatment with the greatest empirical support for numerous internalising disorders in youth (Barrett, Farrell, Pina, Peris, & Piacentini, 2008; David-Ferdon & Kaslow, 2008).

2.3.3 Cognitive Behaviour Therapy for anxiety in typically developing adolescents. CBT is currently regarded as the primary non-psychopharmacological treatment for anxiety and depression in typical individuals (Scattone & Mong, 2013). Treatment of anxiety in typically developing anxious youth has been well researched, with CBT being the empirically supported treatment of choice (Barrett, Duffy, Dadds, & Rapee, 2001). For adolescents, CBT provides coping strategies to target maladaptive thoughts, feelings, and behaviours in order to change distorted thinking and reduce physiological arousal. Over time, the adolescent is able to face anxiety-provoking situations (Green & Wood, 2013). In comparison to adult CBT programs, those designed for children and adolescents are more action-oriented, developmentally aligned to capabilities and interests, and include additional reinforcement (Moree & Davis, 2010). Furthermore, treatment protocols may include education around assertiveness, problem solving, and social skills (Rapee et al., 2009). The fundamental purpose of these therapeutic elements is to specifically alter the central processes that have been theorised to maintain anxiety in youth (Rapee et al., 2009). Since the Coping

Cat program by (Kendall, 1994) was investigated, numerous studies have provided efficacious support for CBT with young people. Following skills-based treatment protocols, there is approximately 55-60% diagnostic remission of anxiety diagnosis in typically developing children, compared to approximately 30% of youth in comparison conditions (Rapee et al., 2009). However, the mediators and moderators central to the effectiveness of CBT programs for youth with anxiety remain underexplored (Prins & Ollendick, 2003).

Unlike adult treatment research, which is mostly disorder-specific, whether children with one type of anxiety demonstrate better response to psychological treatment compared to those with different forms of anxiety is still poorly understood (Hudson et al., 2015a). However, it has been suggested that children with GAD and separation anxiety disorder may respond better to CBT than those with social anxiety disorder (Hudson, 2015). Further, higher pre-treatment severity of child anxiety or having a comorbid non-anxiety diagnosis has predicted poorer treatment outcome (e.g., Hudson et al., 2015a; Liber et al., 2010; Rapee et al., 2009; Wergeland et al., 2016).

Gender has also been studied in child anxiety outcome studies with mixed results. Whilst female gender has been associated with poorer treatment effects in an earlier study by Hudson and colleagues (2013), a later study found no effect of gender on treatment outcome (Hudson et al., 2016). In addition, these authors found that age did not significantly predict treatment outcome. However, the participants in this study were aged less than 13 years. Other studies (e.g., Wergeland, 2016), reviews (e.g., (Knight, McLellan, Jones, & Hudson, 2014; Lundkvist-Houndoumadi, Hougaard, & Thastum, 2014), and meta-analyses (Bennett et al., 2013) have not found treatment outcome to be predicted by age and gender (Wergeland, 2016).

Parental psychopathology has been associated with significantly poorer treatment outcomes (Berman et al., 2000; Crawford & Manassis, 2001; Rapee, 2000), however two large systematic reviews of the literature have since failed to find conclusive evidence for this (Knight, Hudson, McLellan, & Jones, 2014; Lundkcist-Houndoumadi, Hougaard, & Thastum, 2014). Further, family involvement in CBT treatment programs for anxious children has been studied, with inconclusive results (Barmish, Andrea & Kendall, 2005). A number of studies comparing family CBT to a waitlist condition have however, demonstrated that family CBT is superior to waitlist (e.g., Rapee, Abbott & Lyneham, 2006; Shortt, Barrett, & Fox, 2001). Since the type of family involvement varies widely across studies it is difficult to isolate the

components that aid positive treatment response (Rapee, Schniering, & Hudson, 2009). While large studies of client data across sites can elicit common clinical predictors in response to CBT treatment, there is considerable heterogeneity in the samples, differences in recruitment, assessment and treatment, and a strong absence of adolescents, with results predominantly generalised to children. Therefore, a need still exists to identify predictors of treatment outcome as well as identifying children and adolescents who are at risk of poorer outcomes in order to assist in developing more effective treatment for these youth.

2.3.4 CBT for anxiety in adolescents with ASD: Barriers to treatment. Until recently, clinicians have been hesitant in applying CBT to anxious adolescents with ASD due to the unique cognitive profile and core deficits inherent in this client group (Chalfant et al., 2007; Moree & Davis, 2010). Traditional CBT treatment programs rely heavily upon the client's strong linguistic and abstract thinking abilities, which are often in contrast to the visual and concrete learning style of ASD individuals (Reaven, 2009). For example, Socratic questioning and verbal psychoeducation routinely used in CBT programs, assists in linking thoughts, feelings and behaviours but can prove problematic for those with ASD (Castelli et al., 2002; Rotheram-Fuller & MacMullen, 2011). Of particular concern is that these individuals often lack Theory of Mind (TOM), that is, they have difficulty in recognising emotions in themselves and others, which inhibits their ability to infer and shift their cognitive style (Baron-Cohen, 1989; Chalfant et al., 2007). Since this is an important requirement of CBT, Chalfant et al. (2007) explored TOM in these individuals further. These authors found that with the implementation of certain modifications (such as visual aids), individuals with ASD do actually have the capacity to identify their own thoughts and those of others (Chalfant et al., 2007). Since recognising when they are anxious is an integral part of CBT treatment, it has been recommended that a greater focus is placed on affective education (e.g., learning to define and recognise emotions and identifying the intensity of emotions experienced; Green & Wood, 2013).

Despite meta-cognitive impairments inherent in this population, clinicians have been encouraged to use CBT with individuals with ASD. Hare (2004) purports that these individuals share the thinking errors or "all or nothing thinking" (e.g., rigid, biased, and negative perceptions), seen in individuals who suffer anxiety and depression. Since CBT has proven effective in reducing anxiety in this population it has been suggested that those with ASD may additionally benefit from CBT-based meta-cognitive interventions designed for non-ASD individuals with anxiety (Hare,

2004). With these findings in mind, and incorporating appropriate modifications and individualisation, CBT programs for individuals with ASD have begun to demonstrate significant promise in reducing anxiety.

Further characteristics of ASD have been proposed as impediments to the effectiveness of CBT. For example, it has been questioned whether the inherent difficulties in social interaction may interfere with the relationship between therapist and client, one of the central components of successful CBT (Dobson & Dobson, 2009). In addition, the ability to be insightful and self-reflective has been identified as a potential barrier to treatment success, with an increased emphasis on teaching practical skills (e.g., social or adaptive self-help skills) suggested (Kenig & Levine, 2010; Lang et al., 2010). Other unique challenges often inherent in youth with ASD that are likely to hinder therapeutic engagement and successful treatment outcomes include emotional dysregulation, executive dysfunction (such as poor planning, organisation, goal setting, flexibility and working memory deficits) and attention deficits, restricted interests (e.g., may become bored with content outside of specific interest area), communication (e.g., comprehension, literal interpretation), and a lack of motivation and difficulty in skill generalisation (Ozsivadjian & Knott, 2011; Scattone & Mong, 2013). Experiencing difficulties in one or more of these areas can make session engagement challenging. For example, an adolescent may not view their behaviour as problematic and may even deny experiencing anxious symptomology. As such, they are likely to lack motivation in changing the behaviour that the program is targeting (Scarpa & Lorenzi, 2013). Likewise, having strong interests in a particular area may mean that the adolescent does not engage easily in content outside of this area, such as learning about emotion identification. The individual cognitive profile of the adolescent is likely to determine session engagement levels. For example, a child who is affected by executive dysfunction, attention and communication difficulties may experience more problems in understanding and engaging in session content and home practice tasks than a child who is not. As a result, some flexibility, in treatment content and delivery, to address both individual and common needs of adolescents with ASD, need to be considered.

2.3.5 Modifications to CBT Treatment for Individuals with ASD. To account for the core features of ASD that may limit the effectiveness of standard CBT programs, such as social and communication deficits, a number of modifications have been suggested (Cooper, Loades, & Russell, 2018; Mcgillivray & Evert, 2014; Sze & Wood, 2007). These include the need to consider language and developmental levels,

focus on hands-on activities, use direct and flexible teaching methods, and *in vivo* practice, to aid in the generalisation of skills (Anderson & Morris, 2006; Moree & Davis, 2010; White et al., 2009). While evidence on CBT for youth with ASD is still in its infancy, clinical research asserts the following strategies to improve the accessibility of CBT concepts for children and adolescents with ASD.

2.3.5.1 Affective education. Due to common limitations in communication and social skills, adolescents with ASD often experience difficulty in identifying how they, and others are feeling, and in self-reporting thoughts, affective states and physiological sensations (Hagopian & Jennett, 2014). As a result, identifying subjective experiences of fear and anxiety can be problematic and why affective education is emphasised in the treatment of anxiety. Affective education is used to increase the individual's knowledge within her- or himself and others (Scarpa et al., 2013). In CBT programs, individuals with ASD are explicitly taught about the connection between thoughts, emotions, and behaviours (Anderson & Morris, 2006; Attwood, 1999; 2004a). First, basic education on emotions is given (what emotions are, why we have them, and how to recognise emotions in ourselves and others). Second, assistance in translating emotions into words is provided as well as developing ways to reason about thoughts, feelings and behaviours in situations. Specific strategies have been developed to assist in affective education including creating a feelings book (Attwood, 1999; 2004a), using social stories, comic strip conversations, emotion thermometers, and computer programs (Anderson & Morris, 2006; Silver & Oakes, 2001). In addition, an emphasis on teaching children with ASD about the physical symptoms of anxiety as opposed to relying on the subjective emotional feeling, assists the child to concretely identify when he or she is experiencing anxiety.

2.3.5.2 Behavioural strategies. Given that youth with ASD may lack motivation to engage in therapy sessions, an emphasis on providing multiple opportunities to practice skills taught within CBT programs has proven beneficial (Rotheram-Fuller & MacMullen, 2011). Furthermore, concrete behavioural evidence can be gained through practical exercises such as experiential learning and exposure, and can assist in explaining cognitive constructs. In addition, behavioural supports to increase attentiveness and engagement, such as token economies (e.g., having time to talk about interests, chocolates, stars on a chart when child is attentive), prompting, routines (e.g., visual schedule for session plan), and reinforcement plans have been included in CBT programs (Green & Wood, 2013; Rotheram-Fuller & MacMullen,

2011). These positive reinforcement strategies can assist children and adolescents to initially engage in the CBT program and may also be used to help to shape the required behaviour for sessions (e.g., paying attention). Over time reinforcements can be reduced once intrinsic motivation increases. This can occur, for example, as a result of experiencing the effectiveness of coping skills and the benefits associated with attending CBT sessions (e.g., making friends in session or feeling more relaxed after a progressive muscle relaxation exercise).

2.3.5.3 Visual strategies. Reducing abstract language during psychoeducation and cognitive restructuring sessions, and increasing visual learning aids (such as thought bubbles, cartoon scenarios, and emotion thermometers) assists in the identification of thoughts and emotions, and the implementation of cognitive strategies (Lang et al., 2010; Reaven, 2009; Sze & Wood, 2008). For example, Reaven and colleagues (2009) employed visual strategies in their CBT sessions with children (e.g., drawings, photography, and multiple choice lists) to teach basic CBT concepts. Wood et al. (2009) used a number of cartoons to assist in the identification of physiological signs of anxiety, and to generate thoughts to assist with anxiety management. Children were then encouraged to draw their experience of anxiety in the form of cartoons. While remission of all anxiety disorders for over half the children in this study were found, treatment components were not isolated.

2.3.5.4 Graded exposure. Graded exposure is most suited to anxiety disorders where there is an explicit and identifiable stimulus that is being avoided (e.g., social phobia, OCD, and specific phobia) (Hagopian & Jennett, 2014). It has been suggested to be an important part of treatment for anxiety and the preferable and ethical treatment choice compared to exposure through "flooding" (Green & Wood, 2013; Reaven et al., 2009). Gradual exposure exercises incrementally use real or imagined anxiety-provoking situations to face fears and are usually assigned for homework as well as within session. Often, more time is spent on exposure for youth with ASD compared to typically developing children (Chalfant et al., 2007) because behavioural exercises are less abstract and provide concrete feedback which can help to facilitate therapeutic progress (Scarpa & Lorenzi, 2013). Green and Wood (2013) proposed that even if youth do not fully recognise or understand their own anxiety, they are likely to benefit from a decrease in avoidant behaviour, maintained through exposure to anxiety-provoking but harmless stimuli. In the Coping Cat program, 12 out of 16 sessions included exposure therapy for children with ASD compared to 8 out of 16 sessions for

their typically developing peers (Wood et al., 2009). Primary outcomes for the ASD children in this study were found to be comparable to results from a study of typically developing children (Barret et al., 1996; Wood et al., 2006).

2.3.5.5 Incorporating special interests. As mentioned, youth with ASD often have circumscribed interests (American Psychiatric Association, 2000) and therefore may be reluctant to participate in psychosocial sessions since they fall outside their realm of interest. Some researchers have suggested using the strengths, interests, and talents of the individual child to facilitate motivation, interest, and learning during therapy sessions (Reaven et al., 2009). For example, based on the assumption that many children with Asperger's syndrome have a special interest in science or science fiction, Sofronoff et al. (2005) created a metaphor to be used over treatment sessions whereby children were "astronauts" or "scientists" exploring a new planet as they explored their own emotions. Noteworthy, whilst CBT programs have used interests during the psychoeducation and graded exposure components, these are decreased over time to avoid reinforcing problematic obsessions (Moree et al., 2009). However, initial engagement aided by the use of special interests can assist adolescents to being more open to discussing their own emotional challenges (Sofronoff, Beaumont & Weiss, 2014). Therefore, with the issue of motivation being significant for this client group, drawing upon special interests can be an integral clinical tool to therapeutic engagement and progress.

2.3.5.6 Disorder specific hierarchies. In addition to utilising the strategies above, researchers are discovering the value of incorporating disorder specific hierarchies into treatment protocols (Moree et al., 2009). These may be related to difficulties in communication and social skills, adaptive functioning, repetitive or restricted interests, and/or skills associated with daily living. For example, if a child experiences high emotion dysregulation, their CBT program may need to be individualised to promote adaptive emotion regulation. Specific strategies can be implemented as part of the CBT program in order to foster skills in the areas identified as problematic while simultaneously treating comorbid anxiety symptoms (Moree & Davis, 2010).

2.3.5.7 Learning profile. Despite intellectual functioning within, or above, the normal range, individuals with ASD often present with very uneven cognitive profiles on IQ tests (Attwood, 2013). Therefore, anxiety treatment outcomes may be enhanced

if cognitive strengths and weaknesses are taken into consideration by clinicians when designing CBT programs (Scarpa et al., 2013). For example, if the adolescent has advanced visual reasoning abilities, program content may be learnt with the use of demonstration or visual imagery. However, an adolescent with strong reading comprehension skills may learn greatly from reading program text (Scarpa et al., 2013).

In addition, individuals with ASD may experience problems with socioemotional processing, sequential memory, and processing information in novel contexts (Scarpa et al., 2013). Extra time in sessions or across sessions may be required to cognitively process and respond to socioemotional information and this can be aided by supporting verbal with written instruction.

2.3.5.8 ADHD. With high rates of comorbid ADHD amongst the ASD population, session engagement may be impacted when adolescents are having difficulty with sustaining attention, shifting attention (more apparent in those with ASD), impulsivity and/ or hyperactivity (Simonoff et al., 2013). The effect of these behaviours within a group format is more pronounced and can be distracting for fellow participants. Clinicians may need to target certain behaviours with positive reinforcement; include short, structured activities; and break larger components into smaller parts to assist in the adolescent sustaining attention (Attwood & Scarpa, 2013). In addition, difficulties in organisation and planning, working memory and time-management may impede in-session and home practice tasks. Both clinicians and parents may need to prompt and supervise the adolescent to complete activities and behavioural exercises (Attwood & Scarpa, 2013). Overall, an expanded CBT framework is suggested when working with individuals with both ASD and ADHD in order to target attention, hyperactivity, and executive functioning problems.

2.3.5.9 Sensory issues. Poor sensory-motor processing includes low tolerance and high aversion to certain sounds, light, textures, smells or touch and may well interfere with participation in a CBT program. Therapists can determine the sensory needs of the adolescent during assessment and attempt to minimise potentially arousing sensory stimuli within the therapeutic environment (Attwood & Scarpa, 2013).

2.3.5.10 Language profile. Youth with ASD often demonstrate poor pragmatic skills, including problems attuning the rules of spoken language to the social

situation they are in (Scattone & Mong, 2013). It is not uncommon for these children and adolescents to engage in lengthy and verbose monologues, interrupt conversations, use formal over informal language, and demonstrate a literal interpretation of language (Gaus, 2007). In addition, even those with language may struggle to describe their internal experiences (Joshi et al., 2013; Leyfer et al., 2006) and this may interfere with the therapeutic process. For these reasons, CBT therapists need to ensure that communication is concrete and developmentally appropriate (Rotheran-Fuller & MacMullen, 2011).

Overall, each adolescent with ASD has their own cognitive profile which may impact on their anxiety symptomology and interfere with their engagement in treatment and their comprehension of session material. Overall, researchers and clinicians need to account for the individual needs of youth with ASD, address ASD-related barriers to treatment, and align treatment to developmental and functioning levels (Hagopian & Jennett, 2014; Wood et al., 2015). While significant gaps in research remain, there is now an early body of work to guide clinicians in implementing CBT programs for youth with ASD. However, further research to examine treatment efficacy for anxiety in these individuals is needed.

2.3.6 Parent involvement. A number of studies have benefitted from the involvement of parents in treatment programs, with many researchers suggesting treatment outcomes show positive effects when parents are included in the delivery of CBT strategies (e.g., Chalfant et al., 2007; White et al., 2009). Parent involvement can assist with the full implementation of the program and in skill generalisation (Rotheram-Fuller & MacMullen, 2011). In addition, parents can provide encouragement and reinforcement for newly acquired behaviours learnt through the treatment program (Selles & Storch, 2013). Often one parent is involved in a treatment program and training sessions and fulfils the supportive role of consultant, collaborator, or “coach” (Chalfant et al., 2007; Kendall, Aschenbrand, & Hudson, 2003). For adolescents of reasonable functioning and where little comorbidity exists, less parental involvement may be necessary (Velting, Setzer, & Albano, 2004). However, for many adolescents with ASD who are significantly compromised by their anxiety, and young in developmental level, then increased parental participation is likely to benefit treatment gains (Sofronoff, Attwood, & Hinton, 2005).

Among a sample of 10-12- year old children, Sofronoff et al. (2005) evaluated the impact of parent involvement on assisting children to manage their anxiety outside of the clinical setting. Participants were randomly assigned to a child-based

intervention, child and parent intervention, or wait list condition. At post-treatment, children in the child and parent intervention reported fewer anxiety symptoms in comparison to both other groups. These results and others (e.g., Chalfant, et al., 2007; Scarpa and Reyes, 2011) suggest that for pre-teens, parent involvement can have a positive effect in enhancing treatment effectiveness for anxiety reduction.

For older adolescents (15-25 year olds), Mcgillivray and Evert (2014) conducted a study aimed at reducing depression, stress, and anxiety. While there were significant reductions in depression and stress symptomology at post-treatment (as reported by the youth) following CBT intervention, there were no significant changes in anxiety related symptoms. The authors questioned whether the absence of parent involvement in this study attributed to this outcome. To date, a paucity of research aimed at determining the usefulness of parent's involvement in CBT programs particularly for older adolescents with ASD exists. Head-to-head comparisons of CBT programs with and without parent involvement are necessary in future research. Furthermore, understanding what aspects of parent training and involvement potentially aid in successful treatment outcomes for the adolescent would be of great benefit (Scarpa et al., 2013).

2.3.6.1 Parent mental health. Recently it has been highlighted in the research that parental anxiety adversely impacts optimal treatment outcomes for typically developing children. Hudson and colleagues (2014) used the Cool Kids Anxiety program and found that clinically anxious children with non-anxious parents were more likely to experience diagnostic remission post-treatment compared to those with anxious parents. Furthermore, parent's anxiety symptoms reduced following participation in both the family-based CBT and the parent training conditions. The authors proposed that reductions in the child's anxiety may have led to changes in parent's anxiety levels (Hudson et al., 2014). Similar results were found by Cobham et al. (1998) whereby 40% of children were free of their anxiety disorder diagnosis at the end of CBT treatment if they had one anxious parent, compared to 82% of children without anxious parents. Research demonstrates that the efficacy of CBT is substantially reduced when children have an anxious parent. With early evidence that anxious parents are more common in ASD populations, it is probable that this group

of children fare less well following CBT treatment. Further research in this area is certainly warranted.

2.4 Review of CBT Treatment for Anxiety in Youth with ASD

With the identification, development, and implementation of modifications to standard CBT programs (as outlined above), CBT for youth with ASD is emerging as a promising anxiety treatment (McGillivray, 2014). Evidence from the literature supports a combination of the above strategies to be the most effective approach in modifying CBT for use with children and adolescents with ASD (Moree et al., 2009). Manual-based modified CBT interventions have demonstrated effectiveness in both individual therapy and group treatment (Chalfant et al., 2007; Sze & Wood, 2007, 2008). To date, ten pilot studies have involved the examination of the efficacy of CBT protocols targeting the treatment of anxiety in children and youth with ASD (Wood et al., 2014). Previously, researchers have modified traditional CBT due to the unavailability of a specific manual-based CBT program for groups of individuals with ASD. For example, in a manualised treatment study by Chalfant and colleagues (2007) a modified *Cool Kids* CBT program (Lyneham, Abbott, Wignall, & Rapee, 2003) was compared with a waitlist group, among 28 children with a high functioning ASD (8-13 years). In this family-based group program, more time was devoted to relaxation and exposure techniques (both within and outside of sessions), and the 12-session program was implemented over six months. The researchers found that 71% of the participants were free of an anxiety diagnosis upon completion of the program (Chalfant et al., 2007). In comparison, all 19 children in the waitlist condition still met the criteria for an anxiety disorder upon completion of the study. Unfortunately, long-term treatment gains are not known since follow-up data was not collected. In addition, the sample size was small with only the oldest participants falling within the adolescent range. A small number of studies have modified CBT protocols aimed at children with ASD for adolescents with ASD, with mixed results. For example, applying a combination of individual and group anxiety and social skills intervention for 12-17 year olds, White and colleagues (2009) found no significant reduction in anxiety for the treatment group.

Whether youth with ASD gain more treatment success with individual or group treatment has yet to be determined. Indeed, for typically developing youth, little difference in treatment outcomes for group and individual anxiety treatment has been found (Rapee, Wignall, Hudson, & Schniering, 2000). Further comparative research

for youth with ASD is needed (Reaven, Blakely-Smith, Culhane-Shelburne, & Hepburn, 2012). The efficacy of individual and group studies on anxiety reduction for those with ASD will now be examined.

2.4.1 Individual CBT. There have only been approximately eight published studies using individual CBT to reduce anxiety in youth with ASD (e.g., Cardaciotto & Herbert, 2004; Reaven and Hepburn, 2003). Although some of these studies (e.g., Greig and MacKay, 2005; Sze & Wood, 2007) suggest the effectiveness for anxiety reduction using CBT, these were uncontrolled case studies. Furthermore, treatment fidelity, inter-observer agreement, and control for any alternative explanations for anxiety reduction (for example, maturation and concurrent interventions) were absent (Lang, Regester, Lauderdale, Ashbaugh, & Haring, 2010). In fact, to date, randomised controlled trials evaluating individual CBT treatment for anxiety in ASD have been scarce although offer promising results (e.g., Wood et al., 2009; Storch et al., 2015). For example, using a modified CBT program, the Behavioural interventions for Anxiety in Children with Autism (BIACA) protocol Wood et al., (2009) found 63.4% of children (7-11 years of age) no longer met any anxiety disorder criteria at post-treatment, compared to 9% of waitlist participants. Following, Wood et al. (2014) adapted the BIACA protocol for thirty-three adolescents with ASD (11-15 years). While independent evaluator ratings demonstrated significantly lower anxiety scores at post-treatment for the CBT group compared to the waitlist group, no treatment effect was obtained on parent and adolescent questionnaire measures of anxiety, or for remission of primary anxiety disorder diagnosis. The authors noted that these adolescents demonstrated highly complex psychiatric presentations compared to the younger population they had previously studied. For example, adolescents in this study met criteria for 2-7 comorbid diagnoses in addition to their ASD. The authors questioned whether the ADIS-IV-C/P may have been insensitive to smaller changes in symptomology given the baseline severity level of the youth's anxiety.

However, Storch and colleagues (2015) investigated the efficacy of the BIACA protocol with 31 adolescents (11-16 years, mean age of 12.74) and found 11 of the 16 adolescents in the CBT treatment group to be positive treatment responders compared to 4 of the 15 in the TAU group. Although, no changes in child or parent-reported child anxiety were found. Storch and colleagues questioned whether the challenges with a lack of measures specific to this population may have played a contributing role here, and whether parents had difficulty differentiating anxiety and ASD symptomology. In addition, Ehrenreich-May et al. (2014) conducted an open trial with 11-14 year olds

with ASD and clinical anxiety and found a significant reduction in principal anxiety disorder severity scores, and clinician-rated overall anxiety symptoms from baseline to post-treatment.

It has been questioned whether the modular (individual therapy) approach to CBT for anxiety, as demonstrated in the BIACA studies, provides increased efficacy and effectiveness compared to fixed protocols. Some researchers have suggested that modular therapy may better target individualised presenting problems and comorbidities, and contribute to improved overall functioning (Kerns et al., 2016). Currently, a multi-site RCT comparing the BIACA protocol, a fixed CBT protocol (the Coping Cat program; Kendall & Hedtke, 2006), and treatment-as-usual control for children with ASD is being conducted (see Kerns et al., 2016). Results of this and similar studies will assist in determining the efficaciousness of these varying treatment models and whether treatment outcomes differ for individual and group CBT.

2.4.2 Multimodal CBT programs for adolescents with ASD. Due to the proposed bi-directional relationship between social skills deficits and anxiety in individuals with ASD (see Chapter 1), White and colleagues (2013) conducted a randomised controlled trial on Multimodal Anxiety and Social Skills Interventions (MASSI). MASSI is a CBT program that targets concurrent anxiety and social disability in adolescents with ASD via individual therapy, group social skills training, and parent coaching. The reasoning behind this "dual focus" is that adolescents with high levels of anxiety may be less able to make use of the social skills training, avoid opportunities to practice newly learned social skills, or both. Likewise, if the social disability is due to a skill deficit, addressing only anxiety may lead to improved social skill ability (White et al., 2013). MASSI was developed specifically for adolescents with HFA and moderate or greater anxiety problems, and consists of both individual and group sessions. Therapists selected appropriate treatment modules to meet the individual needs of the 30 participants (aged 13-17; mean age of 15 years) and these were repeated where necessary. Parents attended the final 15 minutes of each individual session. The combined treatment was predicted to protect against attrition and promote rapid improvement compared to sequential treatment. Parent-report on the Social Responsiveness Scale (SRS; Constantino & Gruber, 2005) demonstrated 16% improvement in ASD social impairment. Whilst there was a reduction in anxiety symptoms by 26% using the CASI-Anx child and adolescent symptom inventory - 4 ASD anxiety scale (CASI-Anx; Sukhodolsky et al., 2008) this change was not significant. This study was limited by its small sample size, which perhaps contributed

to a smaller effect size (within-group effect size = 1.18) than some previous studies (e.g., Reaven, 2009; Wood, 2009). The authors suggested that this may be due to previous studies having younger participants and more parent involvement, or perhaps more anxiety-targeted CBT is necessary within a dual-focus treatment. It may be that anxiety is better targeted on its own rather than combined with social skills, especially considering the difficulties that some individuals have with switching focus/ tasks.

More recently, Murphy et al. (2017) compared the MASSI protocol outlined above, with an active control group. This pilot RCT for 12-18 year old adolescents with ASD employed non-directive supportive individual and group counselling sessions and compared it to the MASSI intervention to assess anxiety reduction, social functioning and therapeutic alliance. Overall, there were no significant differences found between the two groups on the anxiety, social skills, and therapeutic measures. There was a small group of adolescents that demonstrated a significant reduction in separation anxiety however the authors caution the latter finding since only a small number of participants (n = 9) presented with this diagnosis at pre-test. In addition, attendance at the counselling sessions was notably higher than at the MASSI sessions. Further larger-scale studies are needed to determine whether counselling is more appealing to individuals with ASD then manualised programs.

2.4.3 Group CBT programs for children and adolescents with ASD. Whilst there have been effectiveness studies demonstrating promising results, currently, there have only been six published randomized controlled trial (RCT) studies of group CBT for youth with ASD and co-occurring anxiety disorders (Chalfant et al., 2007; Murphy et al., 2017; Reaven et al., 2012; Sofronoff et al., 2005; Sung, 2011; and White et al., 2013). As discussed above, two of these utilised a multi-modal approach that additionally targeted social skill improvement.

Group treatment is an economical alternative to individual therapy, which is often expensive for parents and therefore difficult to access. Despite suggestions that the linear format of group therapy limits matching intervention techniques to client characteristics among the general paediatric population (Kerns et al., 2016; Wood et al., 2014), group treatment has shown to be at least as effective as individual treatment (Rapee, 2000). Finally, group treatments provide the opportunity for adolescents to share their experiences and normalise their feelings of isolation. With significant social difficulties the opportunity to practice important social skills in a supportive environment can be highly beneficial, particularly for older adolescents with ASD who

are often wanting social relationships but lack the necessary skills to initiate and maintain them (Reaven 2009).

The majority of group CBT anxiety treatment studies have focused on children with ASD. For example, Sofronoff and colleagues (2005) compared child-only and child + parent CBT groups to a waitlist control. Seventy-one children aged 10-12 years with Asperger's disorder and parent-reported anxiety (OCD, social phobia, separation anxiety disorder and/or GAD) attended six weekly CBT sessions. Using the "Exploring Feelings" (Attwood, 2004) program specific to anxiety management, these researchers found a significant reduction in anxiety symptoms for both treatment groups in comparison to the waitlist group.

Children in the child + parent group demonstrated greater improvement than the child-only group and these results were mainly observed at the 6-week follow-up on the Spence Child Anxiety Scale—Parent version (SCAS-P; Nauta et al., 2004) and the Social Worries Questionnaire (SWQ-P; Spence, 1995). The vignette used as a measure, "James and the Math Test", demonstrated significant improvement in the number of strategies children were able to give to cope with anxiety-producing situations. While this study used an experimental design, it lacked blinding procedures. In addition, parents in the child + parent condition may have been more likely to expose their children to, and coach them through, anxiety-provoking situations than parents of children in the child-only condition.

Similar results were found in Chalfant and colleagues' (2007) study whereby the authors adapted the Cool Kids Program (Lyneham, Abbott, Wignell, & Rapee, 2003) to better suit the needs of children and early adolescents with ASD. This program incorporated graded exposure and emphasised relaxation techniques, visual strategies in the cognitive restructuring component, and included simplification of cognitive restructuring tasks (e.g., listing helpful and unhelpful thoughts). The program was also extended to six months in length (9 weekly and 3 monthly 2-hour sessions). Each week parents attended a concurrent session that included psychoeducation, anxiety coping exercises, exposure planning, parent management training, and relapse prevention. Similar to the protocols used by Sofronoff et al., (2005) and Wood et al., (2009), parents were encouraged to serve in the role of "coach" or "co-therapist", to support the delivery of interventions. Together, therapists and parents planned exposure tasks and, consistent with best practice in CBT, these were implemented and rehearsed outside of sessions (Albano & Kendall, 2002). Forty-seven children (aged 8-13 years) with ASD and at least one clinical anxiety disorder

were assigned to either the CBT or waitlist condition. Compared to the waitlist group, the treatment group improved on the Revised Children's Manifest Anxiety Scale (RMAS-P), Spence Children's Anxiety Scale (SCAS-P), Children's Automatic Thoughts Scale, and the Strengths and Difficulties Questionnaire (parent report). Upon completion of the program, 71% of the participants, compared to 0% of the waitlist group, no longer met the criteria for an anxiety disorder diagnosis (Chalfant et al., 2007). Unfortunately, long-term treatment gains are not known since follow-up data was not provided. In addition, the study clinicians conducted the post-treatment diagnostic interview, which may have biased the results (Green & Wood, 2013). Instead, independent evaluators blind to the condition of the participants are likely to have produced more objective results.

In 2008, Reaven and colleagues created an original CBT manual targeting anxiety, as opposed to modifying an existing protocol aimed at typically developing children. They incorporated modifications such as systematic reinforcement, visual aids, and predictable routines, embedding special interests into program content, role-play, video modelling and increased parent participation. They later conducted an RCT implementing random assignment and using independent clinical evaluators blind to condition to conduct pre-and-post assessments (Reaven et al., 2012). Using the Facing Your Fears (FYF) protocol (Facing Your Fears: Group Therapy for Managing Anxiety in Children with High-Functioning ASD; Reaven, Blakely-Smith, Nichols, & Hepburn, 2011) they compared group CBT intervention with treatment-as-usual (TAU) among 50 children with ASD aged 7-14 years. Children in the intervention condition attended 12 group CBT sessions to reduce anxiety with clinicians implementing careful pacing of each session, token reinforcement, visual structure, and predictability of routine, along with additional adaptations (e.g., multiple choice worksheets, hands-on activities, video modelling). In addition, a detailed parent curriculum including anxiety psychoeducation, parent coaching to enhance child participation, and "protective" parenting styles was implemented. Children in the treatment group showed greater reductions in clinician severity ratings of their principal anxiety diagnosis at post-intervention, compared with children in the TAU condition. Those in the treatment condition also met diagnostic criteria for significantly fewer overall number of anxiety diagnoses, and as a group, children in the FYF condition were significantly less likely to meet the criteria for GAD than those in the TAU condition. This latter finding is of interest considering previous research has cited challenges with treatment motivation in participants with a sole diagnosis of

GAD (Wood et al., 2009). All participants who received FYF intervention continued to meet criteria for SEP, SOC and SP diagnoses at post-treatment. Although a small sample of respondents, treatment gains appeared to be maintained for the FYF group at 3- and 6-month follow-up. Differences between the two groups at post-treatment may have been compromised given that some control participants continued to engage in treatment outside of study. The study researchers suggest that future studies include functional measures of success such as school attendance, improved social relationships, and quality of life.

The first anxiety RCT to compare CBT to another treatment type for youth with ASD has been conducted by Sung et al. (2011). Here, 70 children (9-16 years; mean age of 11 years) were randomly assigned to either a 16-week CBT or Social Recreational program. The SCAS-C and the CGI-S measures were taken at pre-, post-treatment, and follow-up (3- and 6-months). Significantly lower levels of generalised anxiety and total anxiety symptoms were found for participants in both programs at 6-month follow-up on the SCAS-C. An increase in the percentage of participants rated as ‘‘Normal’’ and ‘‘Borderline’’ for both programs were found on the clinician ratings on the CGI-S. Standard components in both treatments included regular sessions in a structured setting, consistent therapists, social exposure and the use of ASD-friendly strategies, and hence may be integral to anxiety reduction programs for children and adolescents with ASD (Sung et al., 2011). Since parent training was not included this may have impacted on the generalisation of skills to other settings. This study is likely to be the first in an Asian setting therefore providing preliminary evidence for the effectiveness of CBT in an Asian cultural context (Sung et al., 2011).

Despite some methodological concerns, group CBT treatment studies have demonstrated success in reducing anxiety in children with ASD (e.g., Chalfant et al., 2007). However, there is a scarcity of RCTs investigating anxiety reduction in adolescents, particularly older adolescents.

2.4.4 Adolescents/adults with ASD and anxiety. Providing CBT to ASD adolescents before they reach adulthood has the potential to substantially improve adult outcomes (Gillott & Standen, 2007; Howlin, 2000). A small number of studies, including some described above, have included slightly older adolescents with ASD in their RCTs, with mixed results (e.g., McNally, Keehn, Lincoln, Brown, & Chavira, 2013 [8-14 years]; Murphy et al., 2017 [12-18 years]; Reaven et al., 2009 [8-14 years]; Reaven et al., 2012 [7-14 years]; Russell et al., 2013 [14-65 years]; Storch et al., 2015

[11-16 years]; Sung et al., 2011 [9-16 years]). Amongst these studies, older adolescents have been poorly represented.

A couple of studies using group CBT have focused on young adults. An RCT by Russell and colleagues (2013) investigated CBT treatment for 46 adolescents and adults (mean age 26.9 years). Participants were randomised to CBT for OCD or anxiety management (AM), the control condition. The YBOCS was used as the primary outcome measure and evaluations were blind to the treatment group. Results demonstrated a significant reduction in OCD symptomology for both groups with no significant differences between the two groups at post-treatment (45% were positive treatment responders in the CBT compared to 20% in the AM group). Notably, family accommodation (e.g., parent or carer providing reassurance to person with OCD or working around OCD behaviours) was associated with poorer outcome for participants in this study. While this study demonstrates promise for CBT with older adolescents and adults with ASD and OCD, the wide age range may have impacted findings. Rounsaville et al. (2001) has suggested the need for reducing therapist and participant heterogeneity and opting for tighter parameters when defining the place of treatment, participants and therapists in order to maximise the power available in a small pilot study.

In addition, one study by McGillvray and Evert (2014) examined the efficacy of group CBT on depression, anxiety and stress for 15-25-year-olds (mean age of 20.6) with ASD. They compared individuals allocated to a treatment group ("Think well, feel well and be well" group intervention) with those in a waitlist condition. Content included identifying stressful situations, recognising stress in our bodies, recognising emotions in ourselves and others, relationship between events, thoughts and feelings and coping styles. Whilst no significant differences were found in anxiety symptomology, intervention participants did report significantly lower depression and stress scores on the Depression Anxiety Stress Scales (DASS; Lovibond & Lovibond, 1995) compared to control participants. However, a marked reduction in these symptoms was found for the control group and could be attributed to these participants having contact with the group facilitator on a number of occasions and time to reflect on their feelings through the assessment questionnaire (Mcgillivray & Evert, 2014). Furthermore, the study did not specifically address fears or worries through graded-exposure exercises, and measures were not conducted with parents which has often been viewed in the literature to be a more reliable method of symptomology

assessment. This study lacked random selection of an equal number of participants into the treatment and waitlist groups.

2.5 Summary

While still a relatively new field of study, research investigating the effective treatment of anxiety in youth with ASD still lacks a strong evidence base. A number of aspects of treatment remain unexamined and areas showing promise require more systematic replication. Future research in this area could focus on using stricter methodology and improved evidence-based outcome measures, longitudinal data, and treatment acceptability measures, in order to provide more convincing data.

This chapter briefly reported on pharmacological interventions and highlighted the lack of appropriate medication options for individuals with ASD. A review of individual and group intervention studies for individuals with ASD captured promising and positive effects of CBT-based interventions for decreasing anxiety symptomology in youth with ASD (e.g., Danial & Wood, 2013; Lang et al., 2010; Moree & Davis, 2010; Murphy et al., 2017; Nadeau et al., 2013; Rudy, Lewin, & Storch, 2013; Sukhodolsky, Bloch, Panza, & Reichow, 2013). Accounting for the core deficits of ASD, modifications to CBT treatment have been successfully implemented across numerous studies. However, the majority of work in this area has centred on children. Generally, adolescents, in particular, older adolescents have been poorly represented. In addition, there has been a lack of randomised controlled trials to determine best practice founded on evidence-based interventions. The jury is still out on whether individual or group CBT is more effective in reducing anxiety, the extent to whether parent involvement is necessary, and the isolation of mechanisms that are attributing to anxiety reduction. Further, common study limitations have included assessment measures aimed at typically developing children, small sample sizes, parent or child reports only, and lack of randomization, waitlist groups, follow-up measures, and independent clinical evaluators (Lang et al., 2010b).

The majority of RCTs using CBT protocols to target anxiety reduction in youth with ASD have focused on children and early adolescents. It is likely that parent components of CBT programs need to be modified to suit older adolescents given the increased social demands, heightened anxiety, and additional issues that arise, such as sexual identity and dating. There exists a strong need for the development and assessment of protocols in varying populations, such as an older age group. Information deriving from such studies are likely to provide valuable information

towards the development of an effective, generalisable and maintainable CBT protocol for affected youth.

Chapter 3:

Treating Anxiety in Adolescents with Autism Spectrum Disorder using Group Cognitive Behaviour Therapy: A Randomised Controlled Trial (Study One)

This chapter addreses the gaps in current research pertaining to anxiety treatment for adolescents with co-occuring ASD and clinical levels of anxiety. After identifying existant gaps, the details of Study 1 are provided, which is an RCT assessing the efficacy of group cognitive behavioural therapy for this client group. The study rationale, significance, and aims are then given, followed by the methods used to conduct the investigation. Participant symptoms were measured at pre-treatment, post-treatment, and for the CBT intervention group only, 6-months following treatment. Subsequently, the results are provided. Data were analysed using generalised linear mixed models (GLMMs) followed by subsidiary analyses investigating non-inferiority, reliable and clinically significant change, and clinical global improvement. The chapter concludes with a discussion of the findings.

3.1 Addressing the Gap

In spite of evidence that anxiety may be particularly prominent during the adolescent years (Tse et al., 2007; White et al., 2009; Witwer & Lecavalier, 2010), intervention research in this area has not specifically focused on adolescents (White et al., 2013). In fact, to the author's knowledge, no RCTs exist that singularly focus on investigating group CBT for anxiety reduction in adolescents, including older adolescents, with ASD. A small number of systematic reviews and a trend analysis involving the treatment of anxiety in individuals with ASD have been conducted in this important area (e.g., Danial & Wood, 2013; Ho, Stephenson, & Carter, 2018; Ho, Stephenson, & Carter, 2015; Lang, Regester, Lauderdale, Ashbaugh, & Haring, 2010b). Two-thirds of the studies examined by Ho and colleagues (2015) included participants aged between 10 and 12 years of age. In their recent trend analysis, Ho et al. (2018) observed a noticeable increase in trials with younger participants (aged between 5-8 years). With the predominant focus on children with ASD to date, less is known about how adolescents will respond to treatment and how to best support them in managing anxiety.

As outlined in chapter 2, numerous methodological limitations have been reported by researchers in this field. Further, while some positive outcomes have been reported, it is difficult to compare treatments across studies due to a wide variation in

research designs, treatment approaches, and outcome measurements (Danial & Wood, 2013; Ho, Stephensen, & Carter, 2015). For example, the place of treatment differs (e.g., clinic, community, school), the number and duration of sessions vary, and emphasis on individual components of treatment (e.g., social skills, exposure) may diverge across studies. In addition, the mechanisms of change that are responsible for anxiety reduction in individuals with ASD following CBT treatment are still in question (Lang et al., 2010b). CBT behaviour-oriented components have been shown to be more common in the reviewed studies, with exposure purported as a component of high importance (Ho et al., 2018). The identification of specific components of CBT treatment, and the teaching methods involved that may lead to clinical improvement is imperative in order to create cost and time effective treatment protocols for this client group (Kerns et al., 2016; Lang et al., 2010).

An additional noteworthy gap in the literature is that researchers have used an array of outcome measures, making comparisons across studies difficult. Clinicians have often conducted diagnostic interviews to assess study inclusivity and self-reports have frequently been employed to assess treatment success. Due to the introspective and expressive language difficulties inherent in the ASD population, parent reports are heavily relied upon (Danial & Wood, 2013). However, as discussed in chapter 2, there are benefits to including multiple informants such child and teacher reports. It has been suggested that more stringent methodology and evidence-based outcome measures are required, including blind independent evaluators where possible (Danial & Wood, 2013). Conducting CBT programs over a lengthened timeframe in order for skills to be incorporated more fully into participants' daily lives has additionally been proposed (Chalfant et al., 2007; Danial & Wood, 2013).

Given the high rates of anxiety in adolescents with ASD, and a scarcity of evidence-based manualised programs, the goal of the present randomised controlled trial was to determine whether an evidence-based protocol previously used with children on the autism spectrum, the *Cool Kids* ASD Anxiety program (Lyneham et al., 2003), would be feasible and efficacious for adolescents aged 12-18 years. It was hypothesised that the effects of this family-based intervention would significantly decrease anxiety in adolescents with ASD, improve their social skills, and have a positive effect on family quality of life. Being a manualised program, trained professionals are able to implement the program within the community, increasing its transportability.

To achieve the aims of this study, two studies were conducted. Study 1 tested the efficacy of the intervention using a RCT with pre and post-intervention measures and for the intervention group, 6-month follow-up measures. The intervention group participants attended 12 CBT sessions while the control group waited for treatment. The Consolidated Standards of Reporting Trials (CONSORT) statement for RCTs was referred to as a foundational guideline in reporting methodological requirements (Campbell, Elbourne, & Group, 2004). Considering the proposed value of multiple informants, both parents and children were included in the evaluation of the intervention. In accordance with the literature, independent blind evaluators were used to conduct diagnostic assessments using the Anxiety Disorders Interview Schedule for DSM-IV for Children–Parent Version (ADIS-IV-P; Silverman & Albano, 1996). Due to study budget constraints and the need to limit the number of questionnaires that the adolescents were required to complete, the ADIS-C (child version) was not employed in the current study. However, given that participants were without cognitive impairment and with language ability, this is a valid measure to use and to combine with the parent version. These evaluators also employed the Clinical Global Impression–Improvement Scale (CGI-IS; Guy, 1976) to evaluate anxiety symptomology and overall functioning. In light of some researchers questioning how quality of life may be impacted for families who have a child with an ASD (Ooi et al., 2008), the Beach Center Family Quality of Life Scale (FQOL; Poston, Turnbull et al., 2003) measure was employed to evaluate this aspect. Due to the bidirectional relationship of anxiety and social functioning, the Social Skills Improvement System–Rating Scales (Parent; SSIS–RS [P]; Gresham & Elliot, 1990) was additionally used in order to assess whether social functioning increases when a decrease in anxiety occurs. In addition, treatment adherence was examined by independent clinical evaluators.

Study 2 explored the social validity of the intervention using a combination of qualitative and quantitative methodology employing questionnaires formulated by Gent et al. (2014) and Roberts et al. (2010).

3.2. Rationale, Significance, and Aims of the Current Study

Despite the high prevalence of anxiety disorders among individuals with ASD, and the co-occurring problems that accompany this diagnosis, there is a dearth of research in this area, particularly in regard to older adolescents and appropriate and effective treatment methodologies. In addition, there is a gap in the literature regarding

the impact that a comorbid diagnosis can place upon a family's functioning and quality of life. The results of a preliminary finding suggest that families are adversely affected; however, further exploration of this relationship is needed (Ooi et al., 2008). In addition, researchers have recognised the social difficulties inherent in this population and the association between anxiety and social deficits (e.g., Bellini, 2004; White et al., 2013). The manner in which one affects the other has not yet been determined however it has been suggested that the presence of anxiety contributes to social disability (e.g., Barnhill & Myles, 2001; Kleinhans et al., 2010). While the treatment protocol used in this study does not specifically teach social skills, it is hypothesised that CBT targeting anxiety may produce direct effects on social skills. With anxiety likely to exacerbate depressive symptomology (Tse et al., 2007), in the current study it was hypothesised that intervention targeting anxiety would produce direct effects on depressive symptomology. Therefore, the aim of the present study is to examine the efficacy of a group modified cognitive behavioural therapy intervention on reducing anxiety and internalising disorders in adolescents with high functioning autism spectrum disorder. In addition to a longitudinal follow-up, this study involved an investigation of CBT treatment on depressive symptomology, and social skill ability and family quality of life.

3.3 Hypotheses

Based on previous research, a number of hypotheses regarding the effects of group CBT were generated. In order to evaluate group CBT for adolescents with ASD and clinical anxiety, it was important to examine the effect of time (pre-, post-treatment and follow-up) and condition (CBT and waitlist) on participant symptoms of anxiety. In addition, the hypotheses outlined below were designed to investigate if CBT targeting anxiety can assist in reducing depressive symptomology, and in improving social functioning and family quality of life. The final hypothesis is based on previous findings where CBT participants showed a greater reduction in the total number of psychiatric diagnoses at post-treatment compared to those in the waitlist group (McNally et al., 2013). The Pre-Posttreatment hypotheses are arranged numerically and pertain to anxiety (H1a), depression (H1b), psychosocial functioning (H1c), family quality of life (H1d), and overall psychopathology (H1e).

3.3.1 Pre-post-treatment primary hypotheses.

H1a: Compared to adolescents in the waitlist group, adolescents in the intervention group will show significantly greater pre-post reductions in levels of anxiety (as measured by the SCAS-C, SCAS-P, and ADIS-P).

H1b: Compared to adolescents in the waitlist group, adolescents in the intervention group will show significantly greater pre-post reductions in levels of depression (as measured by the SMFQ-C, SMFQ-P).

H1c: Compared to adolescents in the waitlist group, adolescents in the intervention group will show significantly greater pre-post increases in levels of psychosocial functioning (as measured by the SSIS-P).

H1d: Compared to parents in the waitlist group, parents in the intervention group will report significantly greater pre-post increases in family quality of life (as measured by the FQOL).

H1e: Compared to adolescents in the waitlist group, adolescents in the intervention group will show significantly greater pre-post reductions in the overall number of comorbid disorder diagnoses (as measured by the ADIS-P).

3.3.2 Six-month follow-up primary hypotheses. Hypotheses in this section are based on findings investigating CBT for children with ASD, which show that treatment gains from interventions targeting anxiety are maintained at follow-up (Reaven, Blakely-Smith, Leuthe, et al., 2012; Wood et al., 2009).

H2a: The significant pre-post reductions in levels of anxiety (as measured by the SCAS-C, SCAS-P, and ADIS-P) observed in the intervention group will be maintained or enhanced at 6-month follow-up

H2b: The significant pre-post reductions in levels of depression (as measured by the SMFQ-C, SMFQ-P) observed in the intervention group will be maintained or enhanced at 6-month follow-up.

H2c: The significant pre-post improvements in levels of psychosocial functioning (as measured by the SSIS-P) observed in the intervention condition will be maintained or enhanced at 6-month follow-up.

H2d: The significant pre-post improvements in levels of family quality of life (as measured by the FQOL) observed in the intervention condition will be maintained or enhanced at 6-month follow-up.

H2e: The significant pre-post reductions in total comorbid disorder diagnoses (as measured by the ADIS-P) observed in the intervention condition will be maintained or enhanced at 6-month follow-up.

3.3.3 Secondary hypotheses. Secondary Hypotheses 3-5 involve predictions regarding the diagnostic status of primary anxiety disorders, reliable and clinically significant change and Clinical Global Impression-Improvement (CGI-Improvement; Guy, 1976). That is, the group changes that are predicted in Hypotheses 1 and 2 are also predicted to occur at an individual level (Jacobson & Truax, 1991). Hypothesis 3 is based on previous findings that CBT leads to remission from anxiety symptomology (Wood et al., 2015). Hypothesis 4 involves the prediction that group CBT will result in clinically significant change in SCAS-C/P scores for youth with ASD. In addition, Hypothesis 5 is based on previous studies demonstrating positive treatment response on the CGI Improvements Ratings scale following group CBT (e.g., Reaven & Blakeley-smith, 2013; Wood et al., 2009, 2014; Wood et al., 2015).

H3: Compared to adolescents in the waitlist group, a significantly higher proportion of individuals in the intervention group will demonstrate pre-post remission from their primary anxiety disorder (i.e., will no longer meet their pre-treatment primary diagnosis at post-treatment).

H4: Compared to adolescents in the waitlist group, a significantly higher proportion of adolescents in the intervention condition will show a pre-post reliable reduction in measures of anxiety (SCAS-C/P).

H5: Adolescents in the intervention group will show a significant reduction in anxiety severity from pre-test to 6-month follow-up (as measured by the CGI-I improvement ratings).

3.4 Method

3.4.1 Participants.

3.4.1.1. Power analysis and sample size. The intervention effect is shown in the Group (CBT, control) x Time (pre-, post-intervention) interaction. The primary hypotheses (Hypotheses 1-4), therefore involve predictions of Group x Time interactions. According to G*Power (Version 3.1; Faul, Erdfelder, Lang, & Buchner, 2007), at a per-test alpha-level of .05, 60 participants (30 in each condition) are required for an 80% chance of capturing a “small” to “moderate” Group x Time interaction (f = .185). A moderate interaction was found by Chalfant et al., (2007).

When data are collected longitudinally, there is the problem of participant attrition (wave non-response). Wave non-response will normally reduce statistical power. Compared to the traditional statistical procedures for analysing behavioural

change (e.g., repeated measures ANOVA), the statistical model employed to test hypotheses in the current study (Generalised Linear Mixed Model; GLMM) is less sensitive to participant attrition because it does not rely on participants providing data at every assessment point; the GLMM maximum likelihood procedure is a full information estimation procedure that uses *all* the data present at *each* assessment point (see: Bryk, 1987; Dimitrov & Rumrill, 2003; Holden, Kelley, & Agarwal, 2008). This reduces sampling bias and the need to replace missing data. GLMM implies the use of data present at each assessment point because time (pre-, post-intervention, and 6-month follow-up) is interpreted as a Level 1 variable that is nested within participants at Level 2. This method for accommodating missing data is thought to be superior to an intention-to-treat (ITT) analysis, and the last observation carried forward (LOCF) method (see Lachin, 2015; Lewis & Machin, 1993; Reaven, Blakely-Smith, Leuthe, et al., 2012; Verbeke, Molenberghs, & Beunckens, 2008).

3.4.1.2. Recruitment. Forty-nine adolescents (40 males, 9 females) between the ages of 12- and 18-years (M = 14.23 years, SD = 1.76), were recruited from Perth, Western Australia (WA). This study was therefore underpowered and the impact that low participant numbers have on the overall results will be discussed later in the chapter. Participating parents self-referred in response to advertising flyers and letters circulated through Disability Services Commission (DSC), Therapy Focus, the Department of Education (WA), Catholic Education Office (WA), various autism and disability organisations including Autism West, along with a number of online ASD family support groups, email lists, and by word of mouth. The covering letter and advertisement flyer are displayed in Appendix A. Diagnostically, all youth met criteria for at least one anxiety disorder (see Table 2) with a clinical severity rating (CSR) above 4 as determined by the Anxiety Disorders Interview Schedule for the Diagnostic and Statistical Manual of Mental Disorders (4th ed.; DSM-IV; American Psychiatric Association, 1994), Child Version, Parent Form (ADIS-IV-C/P; Silverman & Albano, 2004). These disorders included social phobia (SoP), generalised anxiety disorder (GAD), specific phobia (SP), separation anxiety disorder (SAD), obsessive-compulsive disorder (OCD), agoraphobia (AGOR) and post-traumatic stress disorder (PTSD). The average number of these disorders per participant was 2.69 (SD = 1.01). Some participants additionally met the criteria for non-anxiety-related disorders (see Table 2). These included attention deficit hyperactivity disorder (ADHD), major

depressive disorder (MDD), dysthymia, oppositional defiant disorder (ODD), and conduct disorder (CD).

3.4.1.3 Inclusion/ exclusion criteria. In addition, adolescents were required to meet the following inclusion criteria: (a) able to demonstrate a clinical diagnosis of ASD, Asperger's disorder, or pervasive developmental disorder – not otherwise specified (PDD-NOS) (see 3.4.2 for more information) (b) aged between 12- and 18-years; (c) a verbal IQ above 70 (as assessed in previous testing, or, if the adolescent's verbal abilities were questioned by the independent assessor at baseline, then based on the Wechsler Intelligence Scale for Children-IV administered by the independent assessor); (d) the ability to read English; and (e) not taking any psychotropic medication or taking a stable dose of psychiatric medication (i.e., at least one month at the same dosage prior to baseline assessment), and, if taking medication, agreement for this to be maintained throughout the study.

Participants were excluded from the study if: (a) the adolescent participated in psychotherapy, social skills training, or behavioural intervention such as applied behaviour analysis over the course of the study, including 6-months following end of treatment for the intervention group; (b) the family were attending child-related health professional services or parenting classes; (c) the adolescent began taking psychiatric medication or changed his or her dosage during the intervention period and for 6 months post-treatment for the intervention group; or (d) the family were not able to participate in the intervention program. At the time of study enrolment 20 (40.8%) participants were taking medication including stimulant, anti-depressant, antianxiety, antipsychotic and/ or other medication (e.g., epilepsy, sleep). The above criteria were applied to ensure that any treatment effects exhibited following the group CBT could be attributed to the intervention, rather than to the effects of external psychotherapy, social skills training, or medication.

3.4.2 Design and procedure. This study was a randomised controlled trial (RCT) and compares an active treatment condition (group CBT) to a waitlist condition, with measures taken at pre-treatment and post-treatment for both conditions, and at 6-month follow-up for the CBT intervention condition (see Figure 2). Figure 6 displays the study design meeting the CONSORT guidelines (Moher et al., 2010). The families who were interested in participating in the study contacted the primary researcher at Curtin University. Those families who appeared to meet the inclusion/ exclusion criteria following a phone call or email exchange with the parent, were sent an

information package containing study information and consent forms for both parents and adolescents, in addition to a demographic form. The parent information letter, demographic form and parent consent forms along with the adolescent information and consent forms (including consent to video recorded sessions) are presented in Appendices B, C, D, E, F and G respectively.

Parents were then contacted by telephone by one of the trained graduate psychology masters or clinical psychology PhD student therapists to attend an in-person anxiety diagnostic assessment (using the ADIS-IV-P) at the Curtin University Child Psychology Clinic. For a small number of families, this interview was conducted at their home (e.g., where the parent had difficulty attending the clinic due to competing demands). At the diagnostic assessment session, the therapist discussed the study information, session structure and confidentiality with the participating parent. The ADIS-IV-P was then administered to the participating parent. When telephoning the parent to make the screening appointment, the therapist requested that the parent provide evidence of their adolescent's ASD diagnosis. Confirmation of diagnosis was viewed and/or photocopied by the therapist at the diagnostic assessment session, with the original returned to the parent. Participants without an ASD diagnosis were excluded from the study. As the primary study aim was to examine anxiety, adolescent ASD diagnoses were not reassessed. In Western Australia, the protocol for an assessment of ASD involves a psychologist trained in ASD assessments, with the collaboration of a paediatrician and a speech pathologist. A cognitive assessment is conducted as part of this assessment and this was used to confirm that the participant had an intelligent quotient above 70. One potential participating parent revealed that their child had not received an IQ above 70 some years previous. A graduate clinical psychology trainee within the Curtin University Child Psychology Clinic reassessed this participant prior to determining their eligibility for the study.

Seven participants did not meet the diagnostic criteria for a clinical anxiety disorder diagnosis and were provided with a list of recommended external treatment providers and excluded from the study (see Figure 6). Consenting and eligible participants were contacted approximately 1 to 2 weeks after completing the screening assessment and informed of their eligibility. Parents and adolescents were asked to complete additional study questionnaires (see *Measures* section) and to return these by post in the prepaid envelopes provided. In addition to the ADIS-P interview, these assessment materials were given at baseline, post-treatment (after the final session), and for the CBT condition only, at 6-month follow-up.

When anxiety co-morbidity was present, the disorder with the highest degree of interference with the adolescent's functioning (determined by the ADIS CSR and clinical judgement) was chosen as the primary diagnosis.

Once a minimum of ten families met study eligibility using the methods outlined above, the primary researcher randomised participants employing Saghaei's (2004) Random Allocation Software Version 1.0. This was repeated each time another 10-12 families were recruited. Overall, twenty-six participants were randomised to the CBT group and twenty-three were randomised to the waitlist condition.

Twelve sessions were provided to the participants in the CBT condition. Although the original Cool Kids program was also 12 weeks in duration, Chalfant and colleagues (2006) suggested that providing the same number of sessions over a longer period of time for individuals with ASD proved beneficial in reducing anxiety symptoms. These authors implemented 9 weekly sessions and 3 monthly sessions. In order to reduce waitlist time, the current study was assessed over 10 weekly sessions followed by the two final sessions one month apart. Participants were randomised to eight groups with between 5-7 participants in each group. Variation in group sizes occurred when there were odd numbers in participant waves prior to randomization. In addition, due to attrition (see 3.6.1), waitlist groups were generally smaller than CBT groups. Participants in the waitlist condition received no psychological treatment for five months. Approximately 2 to 4 weeks after the completion of the pre-intervention ADIS-P, the CBT /condition participants commenced the *Chilled Program* at either Curtin University Child Psychology Clinic or at Autism West in Perth, Western Australia. Parents in both conditions were asked to notify the primary investigator of any changes to medication and dosage over the course of the intervention period. Attendance was recorded for both conditions and all sessions were video-recorded for treatment adherence and clinical supervision purposes.

Following completion of the intervention/waitlist, which was 4.5 months in duration, the ADIS-IV-P was re-administered to parents in both conditions and additional parent and adolescent measures were completed and returned. This was repeated 6 months later for the CBT condition only. The ADIS-IV-P interviewers were blind to the condition to which the families were allocated. Families were asked not to divulge their assigned condition. This was an integral point for comparing the CBT group to the waitlist condition for intervention effects due to the absence of control measures at 6-month follow-up (Tabachnick & Fidell, 2013). At both times,

interviewers asked parents whether there had been any change of medication or external treatment.

Once participants in the WL condition had completed the post-waitlist assessment, they were offered 12-sessions of group CBT over 4.5 months (10 weekly and two sessions one month apart). Post-treatment measures were not collected for the waitlist groups since they had already waited for treatment and it was deemed by the Curtin University Research Ethics Committee that this was a preferable and fairer practice. Participants from the CBT groups were contacted six months following their post-treatment assessment at which time parents and adolescents again completed the questionnaire package and parents were administered the ADIS-IV-P by postgraduate psychology trainees. See "3.4.2.4 Therapists" below for information on therapist recruitment and training.

3.4.2.1 Ethical and registration procedure. The CONSORT guidelines were followed in the development and implementation of this RCT (Moher et al., 2010). Ethics approval for this study was obtained from the Curtin University Human Research Ethics Committee (Approval Number: HR127/2010), the Education Department of WA and the Catholic Education Office (WA) and complied with the Helinski Declaration (World Medical Association, 2008). In addition, the study was registered with the Australian and New Zealand Clinical Trials Registry (2007) was additionally gained (Trial ID: ACTRN12610001014044).

3.4.2.2 Treatment. The Cool Kids program: ASD adaptation (Chalfant et al., 2011), was used for this investigation. The program title was changed to The Chilled Program with linguistic modifications made to ensure appropriateness when speaking with adolescents compared to younger children (e.g., "teens" instead of "children"). In addition, as Figure 4 depicts, many of the graphics were changed to suit adolescents who were older than the original age group of 8-12 year olds that the program was designed for (e.g., Manga figures "Anxious Amy" and "Confident Calvin" replaced the crocodile and alligator characters in the original Cool Kids program).

Figure 2. The Chilled Program characters, "Confident Calvin" and "Anxious Amy."

The Cool Kids Child Anxiety Program: Autism Spectrum Disorders Adaptation (Chalfant et al., 2011) is a CBT-based anxiety reduction program for children and adolescents with ASD. The manual is an adaptation of the Macquarie University, *Cool Kids* program (Lyneham et al., 2003) and is based upon Chalfant and colleague's (2007) randomised control trial which demonstrated a significant reduction in anxiety in ASD children at both post-treatment and at follow-up.

This CBT program teaches children and adolescents cognitive behavioural skills that are targeted to combat anxiety while additionally incorporating social skills and assertiveness training in order to specifically address core ASD deficits. The Cool Kids program (Lyneham et al., 2003) is based on knowledge and empirical evidence about maintaining factors of childhood anxiety including biases in information processing, excessive avoidance, and parental overprotection. The developers of the program have been extensively involved in fundamental research into the nature and maintenance of childhood anxiety (e.g., Hudson et al., 2009). Multiple studies document positive behavioural outcomes at post-test, with at least one study indicating positive behavioural impacts at least one year after the intervention ended (Rapee 2000).

The group CBT consisted of 12 manualised intervention sessions. Each session ran for 2 hours a week for 10 weeks and then once a month for 2 months. The structure of the therapy groups consisted of parents and adolescents attending the first part of the session together. Adolescents then attend a group session together whilst the primary caregivers had a break and time to converse amongst themselves. Parents then attended a session together whilst the adolescents had a supported break with either one or two of the co-therapists. The exception to this is Session 6 where families spend the entire session together, working in parent/child dyads, developing an exposure stepladder. The purpose of the parent session was to address anxiety education, relaxation strategies, cognitive restructuring exercises, graded exposure, parent management training and relapse prevention (Chalfant et al., 2007). Parents were at times required to practice the skills that their adolescent was learning in session as well as to take on the role of "coach" to assist their adolescent in generalising the skills learned across settings. Between sessions the parent and adolescent were required to complete home practice tasks (e.g., relaxation strategies, restructuring thoughts, exposure tasks).

The main areas covered in the program are outlined in Table 1. The program includes recognition of anxious feelings and physical symptoms of anxiety, modified cognitive restructuring exercises, coping, self-talk, and exposure to feared stimuli and relapse prevention. The major components of the program are relaxation and exposure. The material covered is more concrete in nature than the original "Cool Kids" program, requiring participants to be less skilled in communication. The earlier sessions of the program are heavily focused on training, whereby therapists introduce and role-play anxiety management strategies, which are then practised by the adolescents. The latter sessions are considered practice sessions and allow the adolescent to consolidate their new skills and plan their weekly exposure tasks. The exposure tasks serve as homework activities to be completed by the parent/adolescent dyad. Parents attending the concurrent sessions were provided with a parent-based group CBT manual (Chalfant et al., 2006).

Table 1
Outline of the "Chilled Program"

Session	Session Overview
1	Program overview: Parents and adolescents are introduced to therapist, each other and the program. Group rules are established. Feelings and worries are normalised and discussed. Adolescents learn to identify feelings and the three parts of anxiety. Healthy worries versus unhealthy worries are introduced, as are the physiological signs of anxiety. Parents learn about the nature, causes and treatments of anxiety.
2	Learning to relax: Cool breathing and progressive muscle relaxation are introduced and practiced. Adolescents learn to rate their worry on the worry scale. Parents set goals for the program and learn about the "anxiety model" including causes and maintenance of anxiety. Parents learn to target the physical aspects of anxiety and relaxation techniques.
3	Relaxation, imaginal exposure and anxious thoughts: Adolescents imagine a fearful situation to rate their anxiety and to practice their relaxation techniques from Session 2. Activities that help the adolescent to feel good are the focus of the last part of the session. Parents are also introduced to imaginal exposure as well as to the a-b-c model of CBT. Thinking errors are discussed and parents are asked to keep a copy of their feelings, events and thoughts.
4	Learning to think helpful thoughts: Helpful and unhelpful thoughts are introduced, using examples. The consequences of these (feelings) are highlighted. Parents learn about managing the cognitive aspects of anxiety (e.g., helpful/unhelpful thoughts, cognitive restructuring).
5	Becoming the boss of fears and worries: Adolescents identify situations where their anxieties have been restricting them. Parents learn about managing the behavioural components of anxiety (i.e., avoidance). Psychoeducation on exposure is given. Families together: A list of fears/ worries is formulated in each adolescent/parent dyad.

6	Creating stepladders: Family dyads work together to form a stepladder of a fear/worry. A plan to boss back worries is created.
7	Parenting anxiety and bossing worries: Adolescents review their first step and revisit unhelpful thinking. Parents learn about encouraging courageous vs. anxious behaviour, the importance of praise and of modelling, encouraging independent behaviour and reducing protective behaviour. Parents are also given information on breaking down anxious or undesirable behaviour, building coping strategies and managing excessive worry.
8	Dealing with worry: Adolescents review their exposure step and revise relaxation strategies. Parents are informed of challenges that can occur during exposure exercises and also given information on social skills and assertiveness.
9	Creating stepladders and challenges to progress: Adolescents reflect on what they achieved and any pitfalls in their exposure exercises. In addition, they are encouraged to look at how they could help someone with anxiety. Parent engage in a "creating stepladder" activity.
10	Continuing Exposure: Revisit relaxation skills. Parents cover challenges to exposure and plan for the break between sessions.
11	Chronic problems, maintenance and setbacks: Adolescents to think of situations that might make their worries return and how to manage this. Parents review their adolescent's progress and are given psychoeducation on chronic anxiety and depression, as well as how to manage setbacks.
12	Reviewing goals and future plans: Adolescents identify any changes that have occurred for them over the program. Parents review their goals and contemplate future plans. Families together discuss longer term goals and are given an award for participation.

3.4.2.3 Program modifications for adolescents with ASD.

Modifications incorporated in the delivery of the program included:

- The use of visual schedules and token reinforcers.
- The offer for therapists to scribe for adolescents during written tasks.

- The weaving of special interests into the program content;
- The use of sensory and motor items to assist in regulating behaviour (e.g., fidget toys, fit balls and weighted items);
- The *Chilled Program* manga characters ("Anxious Amy" and "Confident Calvin") and the use of these characters and accompanying dress-up props to role-play management of anxiety.
- A hands-on and flexible approach to activities / sessions (e.g., a body drawn on a large sheet of paper to indicate physiological signs of anxiety).

These modifications, while differing in empirically support, are not new to cognitive behavioural therapy programs for youth with ASD (see Chapter 2 for more information on CBT program modifications generally). Due to the unique profiles and varying comorbidities of the adolescent participants in this study, flexibility in program delivery was paramount while simultaneously ensuring protocol adherence. For example, if an adolescent exhibited strong ADHD symptomology, more movement occurred in the session (e.g., role-plays standing up, use of fit ball for the participant, and throwing a small bean toy to the participant when they answer a question). Adolescents who displayed repetitive behaviours in talking about their special interest were provided with time to speak about their interest once they completed a task (preferred reinforcement). In addition, their special interest was woven into the session content to assist them with attending in session. Although a group program, quickly understanding the individual profile of participants and being flexible in the delivery of the content, appeared to assist in program engagement. In addition, creating a safe, validating, and fun environment was essential in order for participants to feel encouraged to return for the next session. This was achieved by allowing the adolescents enough time within sessions to discuss their areas of interest, converse with each other and share experiences (e.g., bullying was an initiated discussion by the adolescents across groups and appeared to be an experience that most participants could identify with), with an attempt to make the sessions as "light" and different to school as possible so that participants could gain a sense of enjoyment at sessions without viewing them as more "school work."

Flexibility was incorporated into the parent sessions given that the client population were older than the original protocol was intended for. While not a formal part of the protocol, parents were able to introduce topics that were likely to be more

relevant to teens such as increased social demands, transition to high school and beyond high school, employment issues, sexual identity and dating.

3.4.2.4 Therapists. Therapists were university psychology graduate trainee Masters or PhD students. The primary researcher (Kidd), who trained in the Cool Kids program and is experienced in working with individuals with ASD, facilitated all of the CBT and waitlist groups, with the assistance of two postgraduate students in the Masters of Clinical Psychology program or the combined Masters/PhD Clinical Psychology program. An exception here was a student in the Masters of Counselling Psychology program who was a registered psychologist with extensive experience and training in ASD. All of the co-therapists were female, reflecting the demographics of the psychology postgraduate cohort.

Prior to co-facilitating the group CBT, these students were required to attend one of two training sessions. The first provided training in administering the ADIS-IV-P for those who were assessors at pre-, post-intervention and/or follow-up. As noted, these students were blind to the intervention condition of each family. Interviewer training involved attending a presentation on the administration of the ADIS-IV-P, observing a videotaped interview whilst following the corresponding completed ADIS-IV-P booklet, and conducting at least one mock interview using the ADIS-IV-P under the supervision of the primary researcher. In addition, all interviews were video recorded with segments viewed and outcome measures discussed with their clinical supervisor whilst on placement in the Curtin University Psychology Clinic. Due to the longitudinal nature of the study and the time-limited Masters program, it was not always possible to have the same student conduct the assessment at pre-, post-intervention and follow-up.

The second training session was tailored to the students who were to assist in the group CBT intervention program. Students were initially provided with reading material on the study intervention, relevant articles (e.g., Chalfant et al., 2007), and information and website links regarding ASD. Students then attended a half-day training session that included an overview of the *Chilled Program* and ASD, working therapeutically with adolescents with high functioning ASD/anxiety and their families, and conceptualising and constructing behavioural experiments. Students were given a copy of the Therapist, Parent, and Adolescent *Chilled Program* manuals to read prior to program commencement (adapted from the Cool Kids ASD Adaptation manuals; (Chalfant et al., 2011).

Clinical supervision was provided to the primary researcher in-between sessions by the project supervisor, Associate Professor Clare Roberts (School of Psychology, Curtin University). Videotaped group sessions were viewed by the project supervisor to ensure that the group CBT protocol was correctly delivered (see checklist information below) and to troubleshoot any difficulties that emerged for participants or therapists. In addition, the primary researcher was in contact with the group co-therapists to discuss facilitator roles and responsibilities prior to each session, in addition to any feedback from the supervision session. Following each group session, all three therapists participated in a brief peer supervision session with any difficulties discussed with the project supervisor.

3.4.2.5 Treatment adherence and session quality. To ensure treatment consistency across the groups, the primary researcher facilitated all sessions with close adherence to the Chilled Program manual. In order to strive for adherence to the intervention protocol, the primary researcher and co-therapists examined a checklist prior to each session (see examples in Appendix H). As established measures of treatment adherence were not available in the existing literature, an adaptation by the primary researcher (Kidd) of the Roberts, Kane, Thomson, Bishop, and Hart (2003) intervention study served as the checklist in this study. At the end of each session therapists completed this program content checklist to determine whether the topics and activities in each module were adhered to, and to evaluate program facilitation. This included overall success of the session, preparation, presentation, rapport with the group, and level of cohesion within the group. A 10-point Likert scale was used to rate each item, ranging from 1 (not at all successful) to 10 (very successful). The primary researcher's project supervisor (Roberts) examined the checklist to ensure that it demonstrated high content validity.

The integrity of treatment adherence is of high importance (Fairburn & Cooper, 2011) and was independently assessed by two graduate clinical psychology trainees (coders) and supervised by experienced clinical psychologists/ clinical placement supervisors at Curtin University Psychology Clinic. The coders, with knowledge of CBT and the treatment protocol, used the same treatment checklist as mentioned above, to rate the facilitator's adherence to the session goals on 25 (24%) randomly selected video recorded CBT and WL group sessions. For example, goals from Session 2 included: (a) review homework (families together), (b) Overview of group rules/ home tasks (c) introduce My Cool Breathing Guide (d) introduce Calvin's Relaxation

Tools, (e) introduce concept of why it's important to relax, (f) introduce The Worry Scale (g) assign home practice tasks. Treatment fidelity was rated at 93% and agreement between the two coders was excellent (k = 1.00), suggesting high adherence to the treatment manual.

The independent coders additionally rated five components of each session on a Likert scale of 1-10 (low to high). The viewed sessions were rated on overall success of session (M = 8.48, SD = 0.71), session preparation (M = 8.96, SD = 0.94), presentation of session (M = 8.16, SD = 1.43), therapist rapport (M = 8.04, SD = 1.46), and group cohesion (M = 7.60, SD = 1.44).

3.4.3 Measures. Demographic information (Appendix C) was collected from each participant and included age, gender, ethnicity, diagnosis, previous interventions, medications, and primary carer/ sibling information. Additional measures were administered on three occasions, pre-intervention (Time 1), post-intervention (Time 2) for both conditions and at 6-month follow-up (Time 3) for the intervention group only (see Figure 3). This study incorporated multi-modal and multi-person assessment as recommended in the psychological literature (Kazdin, 1986). In Study 2 of this thesis, participant satisfaction was assessed following treatment with parents and adolescents in both conditions. This involved the completion of a 7-item rating scale that assessed perceived efficacy of the program (see Appendix I and J).

3.4.3.1 Parent outcome measures.

3.4.3.1.1 Anxiety Disorders Interview Schedule for Children-Parent Version (ADIS-P; Silverman & Albano, 1996). Diagnostic status was assessed using the parent interview schedule of the child version of the ADIS-P, which distinguishes between the DSM-IV anxiety disorders, and excludes other possible comorbid disorders. It involves the utilisation of an interviewer-observer format with items assessing cognitive, behavioural, and physiological responses across a range of potentially anxiety-producing situations (e.g., interacting with peers or separating from a parent). In addition, parents are asked to rate symptom interference on their child's life on a 9-point scale (0 = not at all interfering and 8= highly interfering) with diagnoses derived from the severity level arising from the interview. In the current study, parent-reported Interference Ratings ≥ 4, total number of symptoms endorsed, and the clinical impression for each diagnostic category, formed the independent clinical evaluators Clinician Severity Rating (CSR) across DSM-IV categories. Severity ratings ranged from 0 (absent), 2 (mild), 4 (moderate), 6 (severe), and 8 (very severe). If CSRs ≥ 4

then the adolescent met the criteria for that particular disorder. Research has shown the ADIS-C/P to have sound psychometric properties (Silverman, Saavedra & Pina, 2001) with good reliability, concurrent validity (e.g., Wood et al., 2002), and acceptable to excellent (7- to 14-day) test-retest reliability (k = 0.65–1.00) across anxiety disorder categories (Silverman, Saavedra & Pina, 2001). Previous studies (e.g., Rapee, Barrett, Dadds, & Evans, 1994) have shown moderate to high interrater-reliabilities for the diagnoses of the separate anxiety disorders (k = 0.59 to 0.82). The ADIS-C/P has been successfully used in studies with ASD children and adolescents (e.g., Chalfant et al., 2006, McNally et al., 2013; Wood et al., 2009, Strang et al., 2012) and enables clinicians to determine whether or not the difficulties that the adolescent experiences are severe enough to warrant a diagnosis of anxiety beyond their ASD related difficulties.

3.4.3.1.2 The Spence Children's Anxiety Scale for Parents (SCAS–P; Nauta, Scholing et al., 2004). This measure contains 38 items relating to parent's perception of situations in which their child could experience feelings of anxiety, with parents indicating on a 4-point scale how often each anxiety item occurs for their child. Like the child version of the SCAS, the parent version yields a total score (between 0-114, with 114 being the greatest level of anxiety) and six sub-scales: panic attack and agoraphobia, separation anxiety, physical injury fears, social phobia, obsessive compulsive, and generalised anxiety disorder/ overanxious disorder. The total scale has high internal consistency (Cronbach's alpha = .92) and the six subscales have adequate to excellent internal consistencies with Cronbach's alphas ranging from .61 for physical injury fears to .81 for panic and agoraphobia ((Nauta et al., 2004). With a minimum acceptable value for Cronbach's alpha being .70, the subscales in the present study ranged from .68 to .78 indicating good internal consistency. Based on caregivers of ASD youth, evidence of convergent validity between the SCAS-P, the Kiddie-Schedule for Schizophrenia and Affective Disorders-Present (K-SADS-PL) and the DBC has been found (Zainal et al., 2014). The parent and child versions of the SCAS correlate well with each other, with parent-child agreement ranging from .41 to .66 across the subscales (Nauta et al., 2004). The SCAS and SCAS-P have both been used to measure anxiety symptoms and treatment outcome with high levels of internal validity and reliability (Sofronoff et al., 2005) in anxious children with ASD (e.g., Chalfant et al., 2007; Sofronoff et al., 2005; Sung et al., 2011).

3.4.3.1.3 The Beach Center Family Quality of Life Scale (FQOL; Poston et al., 2003). This scale consists of 25 items assessing family ratings of importance and

satisfaction across five domains: Family Interaction (e.g., “My family enjoys spending time together”), Parenting (e.g., “Family members teach the children how to get along with others”), Emotional Well-being (“My family members have friends or others who provide support”), Physical/Material Well-being (“My family has a way to take care of our expenses”), and Disability-Related Support (“My family member with special needs has support to make progress at school or workplace”). A 5-point scale determines satisfaction with each of the items. Good internal consistency has been demonstrated for both the importance rating (Cronbach’s alpha = .94) and the Satisfaction rating (Cronbach’s alpha = .88). In the present study, Cronbach’s alpha for satisfaction across the five domains ranged from .72 to .82, indicating good internal consistency. Test-retest reliability correlations have been studied for both importance and satisfaction responses for all of the FQOL subscales with all correlations significant at .01 level or beyond. Convergent validity has been demonstrated with both the Family APGAR questionnaire (, which (*r* = .68) (Smilkstein et al., 1982; Hoffman et al., 2006) and the Family Resource scale (*r* = .60; Dunst & Leet, 1987; Hoffman et al., 2006).

3.4.3.1.4 The Social Skills Improvement System–Rating Scales (Parent) (SSIS – RS (P); Gresham & Elliott, 1990). The SSIS-RS is a rating scale for parents to evaluate the social behaviour of their child or adolescent aged between 3- and 18-years-of-age. The SSIS provides information on social behaviour and measures whether the child or adolescent uses various social skills during interactions with others. The questionnaire has been standardised on a sample of 4,000 children and includes separate norms for males and females. Good internal consistency for the social skills scale has been found (Cronbach’s alpha = .83 to .94; Gresham & Elliot, 1990). The convergent validity of the SSIS has been demonstrated against other measures of social competence (Flanagan, Alfonso, Primavera, Povall, & Higgins, 1996). Good test-retest reliability have been shown for the Total Social Skills scores (*r* = .84) and the Total Problem Behaviour scores (*r* = .86) (Gresham & Elliott 2008). In addition, the SSIS-RS has shown to differentiate members of special populations such as autism spectrum disorder, emotional/behavioural disturbance, and speech/language impairment (Gresham & Elliott, 2008).

3.4.3.1.5 The Short Mood and Feelings Questionnaire – Parent (SMFQ-P; Angold & Costello, 1987). This is a 13-item questionnaire completed by parents in order to detect depressive symptomology in their child or adolescent. This questionnaire contains a series of phrases that can help describe how adolescents, aged

13- to 18-years, have been feeling or acting recently and has been successful in discriminating adolescents with major depression from those with sub-threshold depression or no depressive disorder (Daviss et al., 2006). The SMFQ has demonstrated good internal consistency (Cronbach's alpha = .97) (Messer, Angold, & Costello, 1995) and reasonable test-retest reliability (*r* = .78) (Wood, Kroll, Moore, & Harrington, 1995). The MFQ-P has shown a sensitivity of .75 and specificity of .73 for an ICD-10 diagnosis of depression and a sensitivity of .86 and specificity of .87 for DSM-III-R depression (Thaper & McGuffin, 1998).

3.4.3.2 Adolescent outcome measures.

3.4.3.2.1 The Spence Children's Anxiety Scale - Child (SCAS; Spence, 1997). This scale measures the overall levels of anxiety in children and adolescents. It contains 38 items and measures six domains (a) separation anxiety, (b) social phobia, (c) obsessive compulsive problems, (d) panic/agoraphobia, (e) physical injury fears (Items 2, 18, 23, 25, and 33), and (f) generalised anxiety. Each symptom is rated on a 4-point scale ("never", "sometimes", "often", or "always") according to how often the child experiences the symptom. The SCAS has demonstrated sound psychometric properties, with a convergent validity of .75 with the Revised Children's Manifest Anxiety Scale (RCMAS) and an internal reliability coefficient of .93, along with a Guttman split-half reliability of .92 (Spence et al., 2003). Cronbach's alpha for the subscales in the present study ranged from .79 to .86 indicating good internal consistency. Factor analysis confirmed the subtypes of anxiety assessed in the scale have been found to be consistent with the typology of the DSM-IV (APA, 2000). To date, there are no validity data for children with ASD; however, the SCAS has been usefully used in research with children with ASD (e.g., Gillott & Standen, 2007).

*3.4.3.2.2 The Short Mood and Feelings Questionnaire, Child version (*SMFQ-short- C*;* Angold & Costello, 1987). This questionnaire is a 13-item questionnaire completed by children in order to detect depressive symptomology. This questionnaire contains a series of phrases that can help describe how adolescents, ages 13- to 18-years, have been feeling or acting recently and has been successful in discriminating adolescents with major depression from those with sub-threshold depression or no depressive disorder (Daviss et al., 2006). The SMFQ has demonstrated good internal consistency (Cronbach's alpha = .97) (Messer et al., 1995) and reasonable test-retest reliability (*r* = .78) (A. Wood et al., 1995). The MFQ-C at the selected cut-off point showed a sensitivity of .6 and specificity of .61 for ICD-10 depression, and a

sensitivity of .75 and specificity of .74 for DSM-III--R depression (Thaper & McGuffin, 1998).

3.4.3.3 Therapist measures.

3.4.3.3.1 The Clinical Global Impression (CGI) – Improvement Scale (CGI-IS; (Guy, 1976). The CGI-IS is a global rating of improvement in anxiety and overall psychiatric symptoms ranging from 1 “completely recovered” to 5 “no change” to 7 ”very much worse” (see Table 2). The independent clinical evaluator who administer the ADIS-C/P will use this scale to rate each adolescent’s improvement or decline at post-treatment/post-waitlist assessment. A rating will be produced based upon the independent evaluators’ follow-up interview in comparison to baseline ADIS-P interviews in regard to anxiety and related global impairment. The adolescents who receive a rating of 1, or 2 (very much better and much better) will be considered treatment responders while all other cases considered non-responders, following research precedent (e.g., Storch, Lewin, De Nadai, & Murphy, 2010; Walkup et al., 2008; Wood et al., 2014). These ratings were derived in a similar manner to the methods described in previous studies (Walkup et al., 2008; Wood et al., 2009).

Table 2
Guidelines for the CGI-IR ratings

CGI-I guidelines
1 = Very much improved—nearly all better; good level of functioning; minimal symptoms; represents a very substantial change
2 = Much improved—notably better with significant reduction of symptoms; increase in the level of functioning but some symptoms remain
3 = Minimally improved—slightly better with little or no clinically meaningful reduction of symptoms. Represents very little change in basic clinical status, level of care, or functional capacity
4 = No change—symptoms remain essentially unchanged
5 = Minimally worse—slightly worse but may not be clinically meaningful; may represent very little change in basic clinical status or functional capacity
6 = Much worse—clinically significant increase in symptoms and diminished functioning
7 = Very much worse—severe exacerbation of symptoms and loss of functioning

Note. Busner and Targum, 2007. Adapted from Spearing, M.K., Post, R.M., Leverich, G.S., et al. Modification of the Clinical Global Impressions (CGI) Scale for use in bipolar illness (BP): the CGI-BP. Psychiatry Research 1997; 73(3):159–71.

3.5 Data Analysis

A series of generalised linear mixed models (GLMMs) – one for each of the outcome measures - was tested in order to determine whether the intervention group reported pre-post changes on the outcome measures relative to the control group. The GLMMs were implemented through SPSS's (Version 22) GENLINMIXED procedure. The GLMM represents a special class of regression model. The GLMM is "generalised" in the sense that it can accommodate outcome variables with markedly non-normal distributions; the GLMM is "mixed" in the sense that it includes both random and fixed effects. Each of the present GLMMs included two nominal random effects (participant, therapy group), one nominal fixed effect (group: CBT, control),

one ordinal fixed effect (time: pre, post), and one 2-way interactions (Group x Time). Additional GLMMs were tested to determine whether significant pre-post changes in the CBT group were maintained at the 6-month follow-up. These GLMMs included two nominal random effects (participant, therapy group), and one ordinal fixed effect (time: pre, post, follow-up). Significant interactions were followed-up by conducting least significant difference (LSD) contrasts across the simple main effects for time (pre, post). For the GLMMs that tested for maintenance effects within the intervention group, significant time effects were followed-up by conducting LSD contrasts across the main effect of time (pre-, post-intervention, follow-up).

The traditional ANOVA repeated measures model requires the following assumptions to be satisfied: Normality, homogeneity of variance, sphericity, and independence of observations. The GLMM "robust statistics" option was invoked to accommodate violations of normality and homogeneity of variance. Violations of sphericity were accommodated by changing the covariance matrix from the default of compound symmetry to autoregressive. Finally, by specifying the multilevel nature of the current data (participant nested within therapy group) in the GLMM syntax, GLMM was able to accommodate intra-group dependencies in the outcome measures. In order to optimise the likelihood of convergence, a separate GLMM analysis was run for each of the outcome measures. Analysing each outcome independently of the others will inflate the familywise error rate. The per-test alpha was therefore corrected to control the inflation. Changes in the binary outcomes (H3-H6) were analysed using Fisher's Exact 1-sided tests (Bryk, 1987; Holden et al., 2008).

A number of correlations will be conducted in order to investigate possible mediation and moderation effects.

3.5.1 Effect size. The magnitude of the Group x Time interaction was estimated with partial-eta squared. The magnitude of the main effects were estimated with Cohen's *d*. SPSS's GLMM does not output effect sizes so both partial-eta squared and Cohen's *d* were derived by converting *F*-values and the LSD *t*-values into partial-eta squared and Cohen's *d* respectively. For partial-eta squared, values of .01, .06, and .14 represent small, medium and large effect sizes respectively (Richardson, 2011). For Cohen's *d*, values of .2, .5, and .8 represent small, medium and large effect sizes respectively (Cohen, 1988).

3.5.2 The Reliable Change Index. The reliable change (RC; Jacobson & Truax, 1991) score was employed to determine whether time-related change on the

outcome measures was statistically reliable and demonstrative of a genuine behavioural change, as opposed to measurement error (Jacobson & Truax, 1991). The RC score can be interpreted as the degree to which the person changes on the outcome variable divided by the standard error of difference between Time 1 and Time 2 scores. Due to anxiety reduction being the primary focus in the current study, for each adolescent, reliable change indices (RCIs) were calculated on the SCAS-P and SCAS-C. The following formulae was used to calculate reliable change:

Table 3
Formulae used to Calculate Reliable Change

	Reliable change	S_{Diff}	S_E
Formulae	$\frac{x_2 - x_1}{S_{Diff}}$	$\sqrt{2(S_E)^2}$	$S_1\sqrt{1 - f_{xx}}$

An RCI equal to or greater than 1.96 in the direction of healthy range indicates improvement, whereas an RCI of 1.96 or greater in the direction of clinical range indicates deterioration (Jacobson & Truax, 1991). Scores less than 1.96 are classified as unchanged. After the intervention group had received group CBT, the total number of individuals considered recovered, improved, unchanged and deteriorated in anxiety between pre-treatment and post-treatment and pre-treatment and 6-month follow-up were calculated. To determine whether the CBT group had a significantly higher proportion of participants demonstrating change, compared to the WL participants, Fisher's 1-sided tests were conducted. Nonclinical normative data was taken from a large community sample of Australian school children (n = 4916) including boys (n = 2,386) and girls (n = 2,530) between 9-15 years who completed the SCAS-C. The norms provided for the older age range (12-15 years) were employed for the purposes of the current study. Nonclinical normative data for the parent report (SCAS-P) was based on a study of 484 parents of anxiety-disordered children and 261 parents in a normal control group (Nauta et al., 2004)

3.6 Results

3.6.1 Participant flow. Figure 6 displays the CONSORT diagram, which outlines the participant flow through the study. During the recruitment phase of this study, 78 potential families expressed an interest in participating in the study via

contact with the primary researcher. Nine of these families had an adolescent who did not have an official autism spectrum disorder diagnosis and therefore were not eligible for the study, and the remaining 13 families declined (e.g., too busy/ unable to make the session time) or did not return the completed demographic and consent forms. Therefore, fifty-six adolescents and their participating parents were recruited for the study. Seven of these adolescents did not meet the criteria for an anxiety disorder diagnosis and therefore were not included in the study. Three families withdrew from the waitlist condition before completing post-test assessment due to seeking external psychotherapy and one family withdrew from this condition due to relocating overseas. One adolescent withdrew from the treatment group after attending one session due to anxiety interfering with his ability to participate in a group environment (see discussion). Therefore, while 49 families remained at pre-test (26 CBT intervention and 23 WL control), only 44 families (25 CBT, 19 WL) completed post-intervention/waitlist outcome measures. Twenty-four treatment families from the CBT intervention condition completed the primary measure at the 6-month follow-up, although nine of these families did not return completed secondary measures. None of the waitlist participants completed measures after they had received treatment (see Figure 6 below).

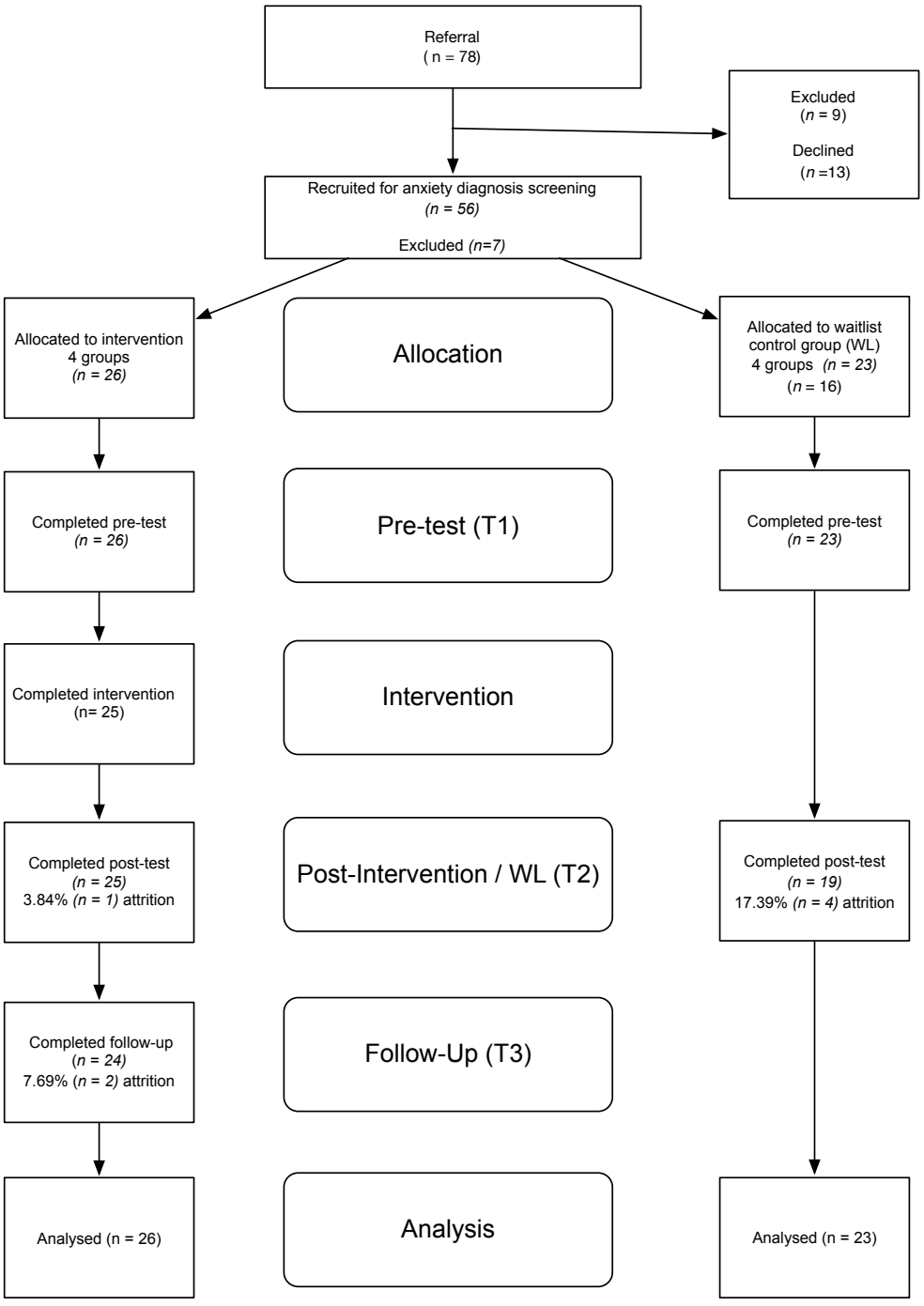

Figure 3. CONSORT diagram of participants' progress through the phases of the study.

3.6.2 Compliance with treatment.

3.6.2.1. Attrition. Four (8.2%) WL control families withdrew from the study prior to post-treatment/intervention measures being taken (one family moved overseas and the remaining wanted to seek psychological treatment immediately). One (2.0%) family withdrew from the CBT intervention condition after attending one therapy session. This participant met criteria for five anxiety disorder diagnosis, in addition to

dysthymia and ASD. He was having difficulty attending school at the time, managing a maximum of 2 days a week. His mother reported that the group environment was too overwhelming for him. Therefore, five out of 49 families (10.2%) did not complete the treatment trial. In addition, another family from the CBT group did not complete follow-up measures.

3.6.2.2. Session attendance. No significant difference was found between the treatment and treated waitlist groups in the number of group therapy sessions attended (CBT Intervention condition: $M = 11.16$, $SD = 1.02$; treated WL control condition: $M = 11.22$, S$D = 1.48$; $t(47) = 0.17$, $p = .87$). Overall, 93.3 % of sessions were attended across conditions with 52.3% of participants attending all 12 sessions, 31.8% attending 11 sessions, 9.1% attending 10 sessions, and 2.3% attending 6, 8 and 9 sessions. Homework compliance and parent reading compliance was not recorded in this study.

3.6.2.3. Adherence to restrictions of external treatment and medication change. At the time of study enrolment, 20 participants (40.8%) were taking prescribed medication, including antidepressant, antipsychotic and stimulant medication. Over the course of the 5-month study, no medications targeting anxiety or mood were reported as having been commenced or terminated in either group; however, there was a reported dosage increase for one participant in the waitlist group.

3.6.3 Data screening and missing data. SPSS Version 22 was used for statistical analysis. Data were entered and re-checked in order to minimise errors in data entry. Data cleaning was then conducted using the SPSS Descriptive and Frequency procedures to determine whether missing or out-of-range values existed (Tabachnick & Fidell, 2007). SPSS Missing Value Analysis was conducted to screen for missing data for unit non-response which is when participants fail to complete a certain assessment or data collection point and therefore not completing any questionnaires. Table 2 displays unit non-response across all three data collection points for both conditions. From the possible 861 data points for the seven outcomes collected across three assessment points, unit non-response was approximately 17%. Given that data were collected over several months, missing data derived from the five participants that dropped out of the study which is referred to as wave non-response, along with those families who failed to return their questionnaire packages. This occurred more frequently for participants in the intervention groups at the 6-month follow-up collection point (36.5% of participants at follow-up had missing questionnaires). Fortunately, as previously stated, all of the primary outcome measures

were completed at each time collection point aside from the five families that dropped out and did not complete their post-measures or follow-up measure.

Compared to the traditional statistical procedures for analysing behavioural change (e.g., repeated measures ANOVA), GLMM is less sensitive to participant attrition because it does not rely on participants providing data at every assessment point; the GLMM maximum likelihood procedure is a full information estimation procedure that uses *all* the data present at *each* assessment point. No participant is dropped from the analysis because all available data are used to obtain parameter estimates. This reduces sampling bias and the need to replace missing data. GLMM is able to use the data present at each assessment point because time (pre, post, 6-month follow-up) is interpreted as a Level 1 variable that is nested within participant at Level 2 (which is itself nested within therapy group at Level 3).

Table 2

Unit Non-response across Time (pre, post and follow-up) and Condition in Outcome Measures

Measure	***n***	**Missing *n* (%)**
ADIS-P	123	6 (4.8)
FQOL	103	21 (17)
SCAS-C	104	20 (16)
SCAS-P	101	23 (18)
SMFQ-C	97	27 (22)
SMFQ-P	102	22 (17)
SSIS-RS	103	21 (17)

Note. Sample sizes varies across variables due to missing data. ADIS-C/P Anxiety Disorder Interview Schedule – Parent, SCAS-C Spence children's anxiety scale – child, SCAS-P Spence children's anxiety scale – parent, SMFQ-C short mood and feelings questionnaire – child, SMFQ-P short mood and feelings questionnaire – parent, FQOL Beach family quality of life scale, SSIS-RS Social Skills Improvement System – Rating Scales.

3.6.4 Comparison of participant demographic and clinical characteristics. Baseline demographic and clinical characteristics were analysed to determine group

equivalence as defined by statistically non-significant differences between groups ($p > .05$). Table 4 illustrates the baseline demographic and clinical characteristics for participants in the intervention and control condition. The sample comprised of more males ($n = 40$) than females ($n = 9$) with the mean age of participants in the CBT condition being 14.73 years, ($SD = 1.79$), similar to that in the WL condition where the mean age was 13.65 ($SD = 1.61$). Employing independent samples *t*-tests revealed no significant differences between the two conditions for participant's age, school grade, and age of ASD diagnosis, nor for age of parents. Fisher's exact tests (2-sided) determined that adolescents did not significantly differ across the two groups in terms of male/female ratio, whether they had sibling/s, their ethnicity, whether English was their first language, their autism spectrum disorder diagnosis, and medication status. In addition, parents did not differ on their marital or employment status across the two conditions. The majority of parents that participated in the program were mothers (88%) and the remaining were fathers (12%). Occasionally parent couples attended sessions together although the participating parent was recorded as the person completing the outcome measures.

Table 4
Pre-treatment Comparability of Participant Characteristics in the CBT Intervention and WL Control Conditions

	Intervention (*n* = 26)			Control (*n* = 23)			Two-sided *t*-test	Entire sample (*n* = 49)		
	M	*SD*	Range	*M*	*SD*	Range		*M*	*SD*	Range
Age (years)	14.73	1.82	12-18	13.65	1.61	12-17	$t(47) = 1.96$, $p = .055$[a]	14.22	1.79	12-18
School Grade	9.77	1.81	7-13	9.06	1.39	7-12	$t(47) = .168$, $p = .136$[a]	9.48	1.68	7-13
Age of ASD Diagnosis	9.22	4.07	2-14	8.50	3.50	2-14	$t(47) = .655$, $p = .516$[a]	8.88	3.79	2-14
Mother's age (years)	45.08	6.05	34-56	43.57	6.97	29-55	$t(43) = .779$, p = .440[a]	44.38	6.46	29-56
Father's age (years)	48.45	6.87	34-61	46.00	8.56	29-60	$t(37) = .988$, p = .330[a]	47.26	7.74	29-61
	n (%)			*n* (%)			Fisher's exact test	*n* (%)		
Gender							$p = .376$			
Male	20 (77)			20 (87)				40 (82)		
Female	6 (23)			3 (13)				9 (18)		
Sibling							$p = .982$			
Yes	24 (92)			20 (87)				44 (90)		
No	2 (8)			3 (13)				5 (10)		
Adolescents' ethnic background							$p = .586$			
Caucasian	24 (92)			21 (90)				45 (90)		
Asian	2 (8)			1 (5)				3 (7)		
Pacific Islander	0 (0)			1 (5)				1 (3)		
English as a first language	26 (100)			23 (100)				49 (100)		
ASD Diagnosis							$p = .630$			
Autism	20 (77)			15 (65)				35 (71)		
Asperger's	4 (15)			7 (30)				11 (22)		
PDD-NOS	2 (8)			1 (4)				3 (6)		
Prior Treatment*	23 (89)			15 (65)			$p = .769$	38 (78)		
Medication**	10 (39)			10 (44)			$p = .445$	20 (41)		
Parents Marital Status							$p = .255$			
Single	9 (35)			5 (19)				14 (29)		
De-facto	1 (4)			0 (0)				1 (2)		
Married	15 (58)			15 (65)				30 (61)		
Remarried	1 (4)			2 (9)				3 (6)		
Mothers Occupation							$p = .091$			
Professional	14 (56)			8 (35)				22 (45)		
Unprofessional	6 (23)			5 (22)				11(22)		
Unemployed	1 (20)			4 (80)				5 (10)		
Fathers Occupation							$p = .286$			
Professional	12 (46)			11 (48)				23 (47)		
Unprofessional	4 (15)			5 (22)				9 (18)		
Unemployed	1 (4)			0 (0)				1 (2)		
Participating Parent							$p = .400$			
Mother	24 (92)			19 (83)				43 (88)		
Father	2 (8)			4 (17)				6 (12)		

Note. [a] *t-test rather than Fisher's exact-sided tests were used to test for group differences in scale outcome variables.* **Prior treatment included Occupational Therapy, Psychology, Speech Pathology, Applied Behaviour Analysis and/or a combination of these.*

***Medication included stimulant (n = 9), anti-depressant (n = 2), antianxiety (n = 5), antipsychotic and other (e.g., epilepsy, sleep) (n = 4).*

****Sample size varies across variables due to missing data*

Table 5 displays baseline outcome measures for participants in the intervention and control conditions. An independent samples *t*-test found that participants in the CBT and WL conditions did not differ significantly on the outcome variable (ADIS-P) for the number of anxiety disorder diagnoses for which they met criteria. Likewise, Fisher's exact tests (2-sided) revealed no significant differences between participants in the CBT and WL groups for the type of primary anxiety disorder diagnosis, or for the type of behavioural and mood disorders comorbid to ASD. Therefore, baseline characteristics were excluded as covariates in the subsequent analyses. While not significant, the largest difference between the two conditions was observed in the number of participants that met the criteria for specific phobia, 16 in CBT condition compared to 8 in the WL condition, $p = .088$.

Table 5

Baseline Psychological Disorders of Entire Sample Randomised to the CBT and WL Conditions based on Parent Response to ADIS-IV-C/P

	Intervention (n = 26)			Control (n = 23)			Two-sided *t*-test	Entire sample (n = 49)		
	M	*SD*	Range	*M*	*SD*	Range		*M*	*SD*	Range
Mean Number of Anxiety Disorder Diagnoses	2.73	1.1	1-5	2.48	1.3	1-5	*p* = .374	2.61	1.16	1-5
							Fisher's exact test			
	n (%)			*n* (%)				*n* (%)		
Primary Anxiety Disorder							*p = .449*			
SOCP	8 (32)			9 (39)				17 (35)		
GAD	9 (36)			6 (32)				15 (31)		
SP	8 (30)			4 (5)				12 (25)		
OCD	1 (4)			3 (13)				4 (8)		
PTSD	0 (0)			1 (5)				1 (2)		
Anxiety Disorders Comorbid to ASD										
SOCP	23 (88)			17 (74)			*p = .273*	40 (82)		
GAD	18 (69)			15 (65)			*p = .502*	33 (67)		
SP	16 (62)			8 (35)			*p = .088*	24 (50)		
SAD	5 (19)			7 (30)			*p = .508*	12 (25)		
OCD	5 (19)			4 (17)			*p = 1.00*	9 (18)		
PD	1 (4)			0 (0)			*p = 1.00*	1 (2)		
AGOR	2 (7)			5 (22)			*p = .230*	7 (14)		
PTSD	1 (4)			1 (4)			*p = 1.00*	2 (4)		
SM	2 (8)			1 (4)			*p = 1.00*	3 (6)		
ENU	1 (4)			0 (0)			*p = 1.00*	1 (2)		
ST	1 (4)			0 (0)			*p = 1.00*	1 (2)		
Behavioural; Disorders *										
ADHD										
Inattentive	8 (31)			10 (43)			*p = .390*	18 (36)		
Combined	7 (28)			2 (9)			*p = .145*	9 (18)		
CD	2 (8)			1 (4)			*p = 1.00*	3 (6)		
ODD	6 (23)			4 (17)			*p = .731*	10 (20)		
Mood Disorders										
MDD	4 (16)			0 (0)			*p = .112*	4 (9)		
Dysthymia	2 (8)			3 (13)			*p = .655*	5 (10)		

Note.

**SOCP social phobia, GAD generalized anxiety disorder, SP specific phobia, SAD separation anxiety disorder, OCD obsessive-compulsive disorder, OCD Obsessive Compulsive Disorder, PD panic disorder without agoraphobia, AGOR agoraphobia, PTSD post-traumatic stress disorder, SM selective mutism, ENU enuresis, ST sleep terror, ADHD attention deficit hyperactivity Disorder, CD Conduct Disorder, ODD oppositional defiant disorder, MDD major depressive disorder.*

All disorders are based on ADIS-C/P CSR of 4 or higher; no participants met criteria for ADHD hyperactive disorder. Percentages do not always add up to 100 percent due to some participants meeting the criteria for more than one disorder or not all participants having a particular disorder.

3.6.5 Concurrent psychiatric symptomology. Analysis of baseline psychological disorders did reveal the psychologically complex presentation of the participants, a notable characteristic found in previous studies targeting anxiety reduction in this population (e.g., Reaven, Blakely-Smith, Leuthe, et al., 2012; Wood et al., 2014). Across the entire sample, participants in this study met the criteria of a mean 2.61 anxiety disorder diagnoses co-occurring with their ASD (see Table 4). However, the number of overall comorbid psychiatric diagnoses (e.g., anxiety and other psychiatric conditions based on ADIS-P Clinical Severity Ratings) ranged from 2 to 6 over and above their ASD diagnosis (M = 3.71, SD = 1.21). While there was an apparent difference between the number of comorbid psychiatric disorder diagnoses at pre-intervention, CBT (M = 4.00, SD = 1.17) and WL (M = 3.39, SD = 1.97) this difference between the two conditions was not significant, $t(47) = 1.80$, $p = .078$, partial $\eta^2 = 0.12$.

3.6.6 Descriptive Statistics. The descriptive statistics for the scale measures in the CBT and WL condition are displayed in Table 6. There was a significant difference between conditions for SCAS-P PD/AGOR subscale, $t(44) = 2.30$, $p = .026$, and the FQOL subscale emotional well-being, $t(45) = 2.11$, $p = .040$. There were no significant differences in pre-treatment scores between conditions for the remainder of the scale measures.

Table 6
Means and (Standard Deviations) of Outcome Variables for the CBT Intervention Condition, Control Condition, and Entire Sample at Baseline

Measure	Intervention (n = 26)	Control (n = 23)	t(df)	p	Entire Sample
SCAS-C Total	29.36 (16.33)	29.00 (10.23)	$t(45) = 0.15$	$p = .883$	29.68 (15.65)
SCAS-C SAD	3.16 (3.25)	3.64 (3.17)	$t(45) = 0.72$	$p = .614$	3.38 (3.29)
SCAS-C SOCP	5.88 (3.36)	7.23 (4.52)	$t(45) = 1.16$	$p = .249$	6.51 (3.96)
SCAS-C OC	6.44 (3.61)	5.00 (3.40)	$t(45) = 1.40$	$p = .167$	5.77 (3.55)
SCAS-C PD/AGOR	4.68 (4.09)	4.14 (3.20)	$t(45) = 0.50$	$p = .618$	4.43 (3.67)
SCAS-C PIF	3.00 (3.09)	3.64 (2.06)	$t(45) = 0.82$	$p = .418$	3.30 (2.65)
SCAS-C GAD	6.20 (3.72)	6.14 (3.18)	$t(45) = 0.06$	$p = .950$	6.17 (3.44)
SCAS-P Total	34.92 (14.63)	29.00 (10.23)	$t(44) = 1.56$	$p = .126$	32.22 (13.03)
SCAS-P SAD	4.40 (3.07)	3.76 (2.41)	$t(44) = 0.77$	$p = .443$	3.11 (2.77)
SCAS-P SOCP	8.56 (5.25)	8.33 (4.02)	$t(44) = 0.16$	$p = .872$	8.46 (4.68)
SCAS-P OC	5.40 (3.34)	4.05 (3.37)	$t(44) = 1.36$	$p = .180$	4.78 (3.39)
SCAS-P PD/AGOR	5.72 (3.14)	3.62 (3.03)	$t(44) = 2.30$	$p = .026$*	4.76 (3.23)
SCAS-P PIF	4.92 (3.11)	4.52 (2.29)	$t(44) = 0.48$	$p = .631$	4.74 (2.74)
SCAS-P GAD	5.88 (2.44)	5.71 (2.33)	$t(44) = 0.23$	$p = .816$	5.80 (2.36)
SMFQ-C Total	5.65 (4.32)	8.00 (4.55)	$t(42) = 1.75$	$p = .087$	6.77 (4.54)
SMFQ-P Total	7.96 (4.13)	8.55 (5.35)	$t(46) = 0.43$	$p = .672$	7.56 (4.87)
FQOL Total	88.69 (15.01)	95.57 (13.67)	$t(45) = 1.63$	$p = .111$	91.77 (14.69)
FQOL Family	21.42 (4.89)	23.19 (4.39)	$t(45) = 1.25$	$p = .216$	22.19 (4.70)
FQOL Parenting	21.12 (4.64)	22.57 (4.46)	$t(45) = 1.08$	$p = .282$	21.77 (4.57)
FQOL Emotional	11.27 (3.03)	13.33 (3.68)	$t(45) = 2.11$	$p = .040$*	12.19 (3.46)
FQOL Physical	20.88 (2.69)	21.48 (3.34)	$t(45) = 0.67$	$p = .504$	21.15 (2.98)
FQOL Disability	14.00 (3.46)	14.86 (2.22)	$t(45) = 0.98$	$p = .332$	14.38 (2.98)
SSIS-RS SS	77.96 (15.99)	76.36 (8.75)	$t(46) = 0.43$	$p = .678$	77.23 (13.08)
SSIS-RS CPB	127.54 (23.80)	120.55 (28.40)	$t(46) = 0.93$	$p = .358$	124.33 (25.96)
SSIS-RS Autism	22.73 (4.55)	22.73 (5.31)	$t(46) = 0.00$	$p = .998$	22.73 (4.86)

Note. Sample sizes varies across variables due to missing data.

SCAS-C Total Spence children's anxiety scale – child (total score), SCAS-C SAD Spence children's anxiety scale (separation anxiety), SCAS-C SOCP Spence children's anxiety scale (social phobia), SCAS-C OC Spence children's anxiety scale (obsessive compulsive), SCAS-C PD/AGOR Spence children's anxiety scale (panic/ agoraphobia, SCAS-C PIF Spence children's anxiety scale (physical injury fears), SCAS-C GAD Spence children's anxiety scale (generalised anxiety), SCAS-P Total Spence children's anxiety scale – Parent (total score), SCAS-P SAD Spence children's anxiety scale (Separation anxiety) SCAS-P SOCP Spence children's anxiety scale (social phobia), SCAS-P OC Spence children's anxiety scale (obsessive compulsive), SCAS-P PD/AGOR Spence children's anxiety scale (panic/ agoraphobia, SCAS-P PIF Spence children's anxiety scale (physical injury fears), SCAS-P GAD Spence children's anxiety scale (generalised anxiety), SMFQ-C short mood and feelings questionnaire –

child, SMFQ-P short mood and feelings questionnaire – parent, FQOL Total Beach family quality of life scale (total score), FQOL Family Beach family quality of life scale (family interaction), FQOL Parenting Beach family quality of life scale (parenting) FQOL Emotional Beach family quality of life scale (emotional well-being), FQOL Physical Beach family quality of life scale (Physical/ Material Well-being), FQOL Disability Beach family quality of life scale (Disability-Related Support), SSIS SS The Social Skills Improvement System – Rating Scales (Parent) (Social Skills Standard Score), SSIS CPB The Social Skills Improvement System – Rating Scales (Parent) Competing Problem Behaviour Standard Score, SSIS Autism The Social Skills Improvement System – Rating Scales (Parent) Autism Raw Score.
*$p < .05$. **$p < .01$. ***$p < .001$.

3.6.7 Hypothesis testing. The tested hypotheses for study one are detailed below. Comparisons on the outcome variables between pre-intervention and post-intervention for the CBT and WL groups are also presented below in Table 6. Initial findings pertain to the anxiety outcome measures (ADIS-P and SCAS-C/P). The total number of anxiety disorders is additionally examined. The hypotheses are arranged numerically and pertain to anxiety (H1a), depression (H1b), psychosocial functioning (H1c), family quality of life (H1d), and overall psychopathology (H1e). Whether post-intervention observed changes are maintained at 6-month follow-up is then examined from H2a-e (CBT group only) with follow-up data for the CBT group displayed in Table 8. Secondary Hypotheses 3-5 make predictions regarding diagnostic status of primary anxiety disorders, reliable and clinically significant change and Clinical Global Impression-Improvement (CGI-Improvement; Guy, 1976). This is followed by the exploration of whether anxiety reduction intervention can assist in reducing depression and improving social functioning and family quality of life.

3.6.8 Primary hypothesis testing.

3.6.8.1 Hypothesis 1a: Anxiety.

Table 7

Adjusted Means and Standard Errors of Anxiety and ADIS-P Outcome Variables at Baseline and Post-test for the Intervention and Control Conditions

	Condition Effect	Time Effect	Condition*Time Effect	Partial η2	Intervention Condition				Control Condition			
					Baseline *M(SE)*	Post-Treatment *M(SE)*	*Simple main effects of time p-value*	Cohen's *d*	Baseline *M(SE)*	Post-Waitlist *M(SE)*	*Simple main effects of time p-value*	Cohen's *d*
NOAD	*F*(1,89) = 15.17	*F*(1,89) = 19.07	*F*(1,89) = 25.04	0.38	2.73 (0.06)[a]	1.46 (0.17)[b]	7.32	2.93	2.52 (0.13)[a]	2.54 (0.13)[a]	0.16	0.05
	p < .001***	*p* < .001***	*p* < .001***				<.001****				0.907	
Anx CSRs	*F*(1,89) = 0.25	*F*(1,89) = 35.81	*F*(1,89) = 25.42	0.22	16.92 (0.84)[a]	8.18 (1.49)[b]	9.39	3.76	13.56 (0.75)[a]	13.13 (1.26)[a]	0.34	0.14
	p = .619	*p* = .001***	*p* = .001***				<.001***				0.738	
SOCP	*F*(1, 89) = 0.20	*F*(1,89) = 0.15	*F*(1,89) = 2.88	0.03	5.41 (0.33)[a]	4.26 (0.76)[a]	1.66	0.66	4.10 (0.67)[a]	4.91 (0.49)[a]	0.75	0.32
	p = .605	*p*= .696	*p* = .093				0.101				0.29	
GAD	*F*(1,89) = 0.19	*F*(1,89) = 26.96	*F*(1,89) = 8.64	0.09	4.54 (0.70)[a]	1.28 (0.28)[b]	4.67	1.87	3.67 (0.42)[a]	2.65 (0.48)[b]	2.69	1.15
	p = .666	*p* < .001***	*p* < .004**				<.001***				.008**	
SP	*F*(1,89) = 0.07	*F*(1,89) = 2.94	*F*(1,89) = 10.04	0.1	3.08 (0.25)[a]	1.42 (0.52)[b]	7.98	3.19	2.04 (0.54)[a]	2.80 (0.89)[a]	0.82	0.35
	p = .789	*p* = .090	*p* < .002**				<.001***				0.416	
SAD	*F*(1,89) = 0.40	*F*(1,89) = 1.19	*F*(1,89) = 0.06	0	1.16 (0.43)[a]	0.63 (0.33)[a]	1.01	0.4	1.47 (0.47)[a]	0.86 (0.60)[a]	0.69	0.29
	p = .530	*p* = .280	*p* = .940				0.315				0.495	
OCD	*F*(1,89) = 1.83	*F*(1,89) = 2.74	*F*(1,89) = 1.80	0.01	1.03 (0.51)[a]	0.05 (0.03)[b]	1.99	0.8	0.97 (0.31)[a]	0.89 (0.19)[a]	0.2	0.08
	p = .179	*p* = 2.74	*p* = .183				.049*				0.843	

PD	*F*(1,89) =1.40	*F*(1,89) = 1.40	*F*(1,89) = 1.40	0.01	0.19 (0.16)[a]	0.00 (0.00)[a]	1.18	0.47	0.00 (0.00)[a]	0.00 (0.00)[a]	0	0
	p = .239	*p* = .239	*p* = .239				0.239				0	
AGOR	*F*(1,89) = 0.70	*F*(1,89) = 0.48	*F*(1,89) = 0.63	0.01	0.63 (0.56)[a]	1.17 (0.20)[a]	0.12	0.05	0.53 (0.46)[a]	0.66 (0.35)[b]	2.36	1.01
	p = .404	*p* = .492	*p* = .629				0.902				.021*	
PTSD	*F*(1,89) = 2.08	*F*(1,89) = 0.07	*F*(1,89) = 0.27	0	0.20 (0.16)[a]	0.00 (0.00)[a]	1.18	0.47	0.30 (0.26)[a]	0.37 (0.29)[a]	0.14	0.06
	p = .150	*p* = .791	*p* = .604				0.239				0.89	
SM	*F*(1,89) = .025	*F*(1,89) = 3.35	*F*(1,89) = 4.76	0.05	0.31 (0.15)[a]	0.01 (0.01)[b]	2.03	0.81	0.17 (0.15)[a]	0.19 (.17)[b]	0.88	0.16
	p = .875	*p* = .067	*p* .032*				.045*				0.38	
ENU	*F*(1,89) = .3.72	*F*(1,89) = 0.03	*F*(1,89) = .050	0	0.15 (0.13)[a]	0.20 (0.17)[a]	0.2	0.08	0.00 (.000)[a]	0.01 (.007)[a]	1.167	0.49
	p = .057	*p* = .866	*p* = .823				0.84				0.246	
ST	*F*(1,89) = 1.39	*F*(1,89) = 1.40	*F*(1,89) = 1.40	0.02	0.19 (0.16)[a]	0.00 (0.00)[a]	1.18	0.47	0.00 (0.00)[a]	0.00 (0.00)[a]	0.84	0.35
	p = .240	*p* = .239	*p* = .239				0.239				0.402	
DYS	*F*(1,89) = 0.58	*F*(1,89) = 15.79	*F*(1,89) = 0.58	0.01	0.50 (0.23)[a]	0.00 (0.00)[b]	2.15	0.86	0.74 (0.21)[a]	0.00 (0.00)[b]	3.55	1.51
	p = .445	*p* < .001*	*p* = .445				.034*				<.001***	
MDD	*F(1,89) =0 .00*	*F(1,89) = 0.47*	*F(1,89) = 6.31*	0.07	0.94 (0.53)[a]	0.23 (0.15)[b]	1.73	0.33	0.02 (0.02)[a]	1.22 (0.64)[b]	1.9	0.81
	p = .979	*p = .493*	*p = .014**				0.088				0.061	
ADHD COM	*F*(1,89) = 0.86	*F*(1,89) = 0.05	*F*(1,89) = 0.07	0	1.89 (0.97)[a]	1.41 (0.56)[a]	0.96	0.38	0.46 (0.29)[a]	1.10 (0.65)[a]	1.7	0.41
	p = .356	*p* = .826	*p* = 0.74				0.342				0.092	
ADHD	*F(1,89)= 0.51*	*F(1,89) = 7.47*	*F(1,89) = 0.71*	0.01	1.92(0.36)[a]	1.27 (0.68)[a]	1.66	0.66	2.71 (0.37)[a]	1.45 (0.65)[b]	2.15	0.92
INN	*p = .476*	*p = .008***	*p=.400*				0.101				.035*	
ODD	*F(1,89) = 0.60*	*F(1,89) = 15.82*	*F(1,89) = 0.12*	0.01	1.46 (0.54)[a]	0.62 (0.37)[a]	1.98	0.79	1.21 (.076)[a]	0.21 (0.18)[b]	5.5	2.35
	p = .44	*p < .001****	*p = .734*				0.05				<.001***	
CD	*F(1,89)= 0.01*	*F(1,89)= 0.01*	*F(1,89)= 0.41*	0	0.34 (0.29)[a]	0.16 (0.14)[a]	0.5	0.2	0.17 (0.15)[a]	0.31 (0.24)[a]	0.4	0.29
	p =.933	*p = .923*	*p = .523*				0.616				0.689	

Note. Change in subscript denotes a significant change between baseline and post-treatment/post-waitlist. Partial η2 = partial eta squared; Sample sizes varies across variables due to missing data. ADIS-P Anxiety Disorder Interview Schedule – Parent Number of Anxiety Disorders (NOAD), ADIS-P Total Dx Anxiety Disorder Interview Schedule – Parent total psychiatric diagnoses, SOCP social phobia, GAD generalized anxiety disorder, SAD separation anxiety disorder, OCD obsessive-compulsive disorder, SP specific phobia, PD panic disorder with agoraphobia, AGOR agoraphobia, PTSD post-traumatic stress disorder, ADHD COM attention deficit hyperactivity disorder (combined), ADHD INN attention deficit hyperactivity disorder (inattentive), MDD major depressive disorder, ODD oppositional defiant disorder, SCAS-C Spence children's anxiety scale – child (Total).

Baseline and Posttest anxiety disorder is based on ADIS-C/P CSR of 4 or higher.

*$p < .05$. **$p < .01$. ***$p < .001$.

The purpose of Hypothesis H1a was to determine if adolescents in the intervention group would show significantly greater pre-post reductions in levels of anxiety (as measured by the SCAS-C, SCAS-P, and ADIS-P) compared to the WL group. Independent t-tests revealed no significant difference between the CBT and WL groups in their number of pre-treatment anxiety diagnoses. However, a large significant Condition x Time interaction was found in the overall number of post-treatment anxiety disorder diagnoses (see NOAD in Table 7 and Figure 6). Post-hoc least significant difference (LSD) contrasts conducted across the simple main effects for time indicated a large significant pre-post decrease for the intervention group, but no significant pre-post change for the control group.

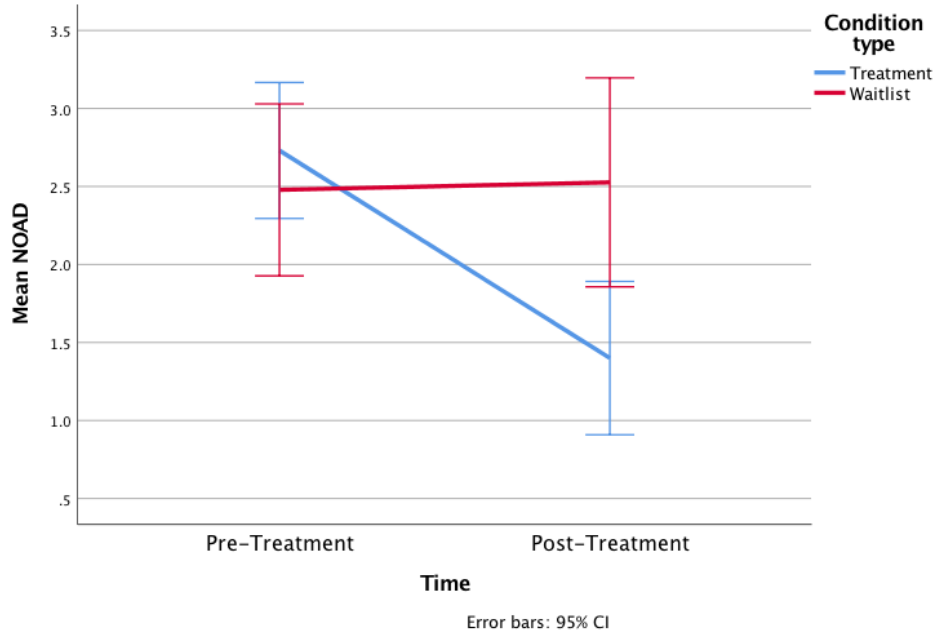

Figure 4. The change in the number of anxiety disorder clinical severity ratings across time and condition.

Further analyses were conducted to ascertain whether significant decreases in severity occurred for overall anxiety and particular anxiety disorders using the Clinical Severity Ratings (CSR) values from pre-intervention to post-intervention on the ADIS-P. Table 7 shows that there was a significant Condition x Time interaction for CSR ratings across all anxiety disorders. LSD contrasts conducted across the simple main effects for time indicated a significant decrease from pre-post for the CBT condition, but not for the WL condition. Upon further examination, significant Condition x Time interactions for both specific phobia and generalised anxiety disorder CSRs were found. LSD contrasts conducted across the simple main effects for time indicated a significant pre-post decrease in CSRs for specific phobia in the

CBT group, but no significant pre-post change for the control group (see Table 7 and Figure 7).

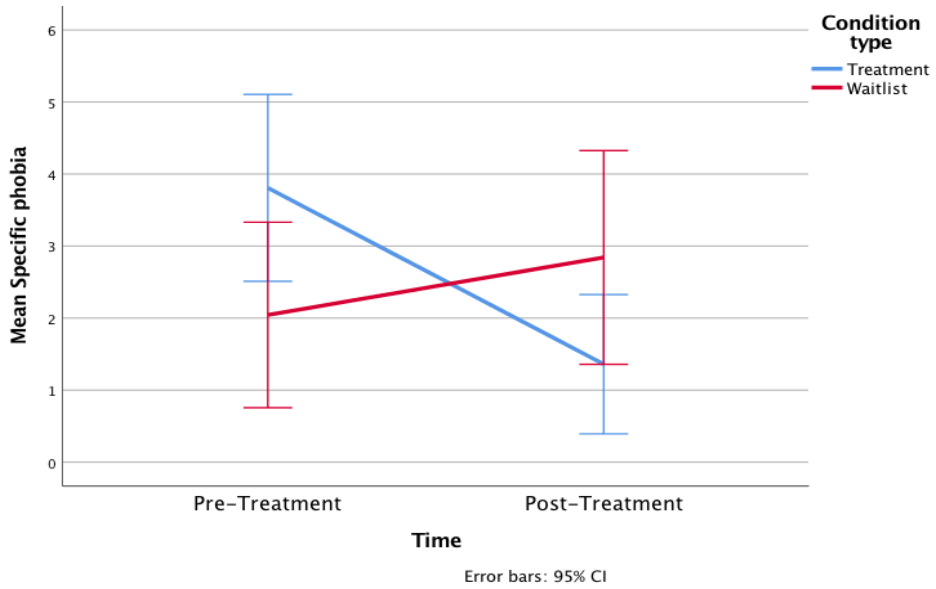

Figure 5. The change in Specific Phobia CSRs across time and condition

In addition, LSD contrasts conducted across the simple main effects for time indicated that CSRs for GAD significantly decreased from pre-intervention to post-intervention for both groups. However, the significant Condition x Time interaction for GAD indicates that the intervention group showed a greater pre-post reduction in CSRs compared to the control group (see Figure 9).

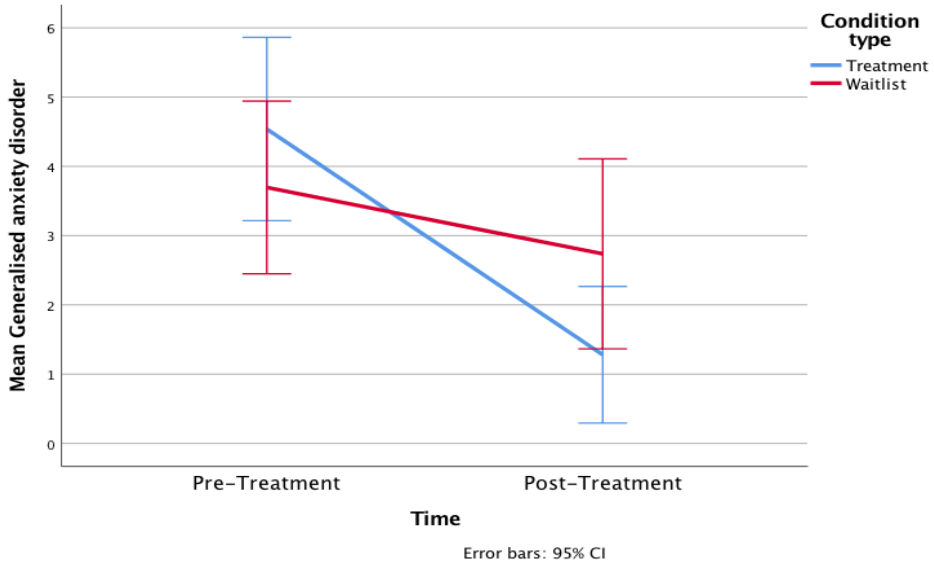

Figure 6. The change in generalised anxiety disorder clinical severity ratings across time and condition.

Table 8

Adjusted Means and Standard Errors of SCAS-C/P at Baseline and Post-test for the Intervention and Control Conditions

	Condition	Time	Condition*Time	Partial	Intervention Condition				Control Condition			
	Effect	Effect	Effect	η2	Baseline	Post-Treatment	*Simple main effects of time*	Cohen's	Baseline	Post-Waitlist	*Simple main effects of time*	Cohen's
					M(SE)	*M(SE)*	*p-value*	*d*	*M(SE)*	*M(SE)*	*p-value*	*d*
SCAS-C	$F(1,84) = 0.10$	$F(1,84) = 0.90$	$F(1,84) = 0.98$	0.01	29.63 (4.86) [a]	27.20 (3.80) [a]	1.05	0.58	29.78 (1.44) [a]	29.85 (0.74) [a]	0.08	0.45
	$p = .753$	$p = .346$	$p = .324$				0.296				0.076	
SCAS-P	$F(1,81) = 0.04$	$F(1,81) = 24.62$	$F(1,81) = 46.98$	0.36	34.95 (2.44) [a]	24.64 (1.54) [b]	11.27	4.51	28.58 (1.66) [a]	29.92 (2.06) [a]	0.89	0.38
	$p = .840$	$p < .001$***	$p < .001$***				<.001***				0.375	

Note. Change in subscript denotes a significant change between baseline and post-treatment/post-waitlist. Partial η2 = partial eta squared; Sample sizes varies across variables due to missing data. SCAS-P = Spence children's anxiety scale – parent, SCAS-C = Spence children's anxiety scale – child. *$p < .05$. **$p < .01$. ***$p < .001$.

Any changes in adolescent anxiety were additionally measured with the SCAS-C/P Total Scores (see Table 8 and Figure 9). There was a large significant Condition x Time interaction on the parent-reported anxiety symptomology at post-treatment (see Figure 8). Post-hoc LSD contrasts indicated that parents in the CBT group reported a significant pre-post decrease in anxiety symptomology however, no significant change was reported by parents in the WL group. In addition, for adolescent-rated symptomology (SCAS-C Total Score), there was no significant Condition x Time interaction, no significant main effect for condition, and no significant main effect for time.

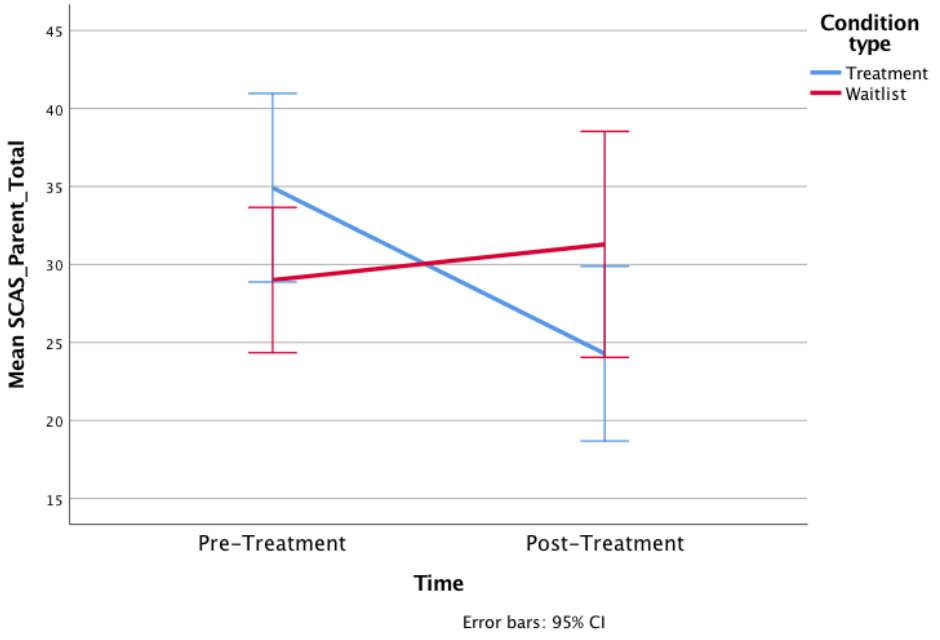

Figure 7. The change in parent reported anxiety (SCAS-P) across time and condition

Given the significant findings in the SCAS-P, the subscales of this measure were investigated with Table 9 demonstrating medium and large significant Condition x Time interactions for all of the SCAS-P subscales except for the Obsessive-Compulsive subscale (there was however a small significant main effect for time on this subscale). Post-hoc LSD contrasts demonstrated significant reductions in anxiety on each of the subscales for the CBT group. The only significant change across time for the WL group was on the social phobia subscale where anxiety showed an increase between pre-and post-test.

Table 9

Adjusted Means and Standard Errors of SCAS-Parent Subscale Outcomes at Baseline and Post-treatment/Post-waitlist for the Intervention and Control Conditions

	Condition Effect	Time Effect	Condition*Time Effect	Partial η^2	Intervention Condition				Control Condition			
					Baseline *M(SE)*	Post-Treatment *M(SE)*	*t/ p-value*	Cohen's *d*	Baseline *M(SE)*	Post-Waitlist *M(SE)*	*t/ p-value*	Cohen's *d*
SEPANX	$F(1,81) = 1.11$	$F(1,81) = 7.58$	$F(1,81) = 7.58$	0.09	4.39 (0.64)[a]	3.69 (064)[b]	10.30	4.12	3.67 (0.64)[a]	2.94 (0.32)[a]	1.42	.61
	$p < .296$	$p < .296$	$p < .007$**				<.001***				.161	
SOCP	$F(1,81) = 1.82$	$F(1,81) = 9.63$	$F(1,81) = 63.42$	0.44	6.68 (0.28)[a]	6.33 (0.52)[b]	5.89	3.76	7.99 (0.61)[a]	8.60 (0.55)[b]	2.28	.97
	$p = .181$	$p < .003$**	$p < .001$***				<.001***				<.025*	
OC	*F(1,81)= 0.41*	*F(1,81) = 9.17*	*F(1,81) = 3.52*	0.04	5.44 (0.39)[a]	3.36 (0.35)[b]	8.43	3.37	4.22 (0.74)[a]	3.73 (0.64)[a]	0.60	.26
	p = .525	*p < .003***	*p = .064*				<.001***				.548	
PD/AGOR	$F(1, 81) = 0.49$	$F(1,81) = 3.64$	$F(1,81) = 14.78$	0.15	5.74 (0.84)[a]	3.29 (0.53)[b]	5.68	2.27	3.52 (0.58)[a]	4.35 (0.60)[a]	1.14	.48
	$p = .487$	$p = .060$	$p < .001$***				<.001***				.260	
PIF	$F(1, 81) = 0.02$	$F(1,81) = 20.22$	$F(1,81) = 8.86$	0.10	4.87 (0.74)[a]	3.83 (0.54)[b]	4.46	1.78	4.56 (0.57)[a]	4.37 (0.43)[a]	1.28	.55
	$p = .882$	$p < .00$***	$p < .004$**				<.001***				.203	
GAD	$F(1, 81) = 0.49$	$F(1,81) = 3.64$	$F(1,81) = 14.78$	0.15	5.74 (0.84)[a]	3.29 (0.53)[b]	5.68	2.27	3.52 (0.58)[a]	4.35 (0.60)[a]	1.14	.48
	$p = .487$	$p = .060$	$p < .001$***				<.001***				.260	

Note. Change in subscript denotes a significant change between baseline and post-treatment/post-waitlist. Partial η2 = partial eta squared; Sample sizes varies across variables due to missing data. SEPANX = Spence Children's Anxiety Scale (Separation Anxiety), SOCP = Spence Children's Anxiety Scale (social phobia), OC = Spence Children's Anxiety Scale (obsessive compulsive), PD/AGOR = Spence Children's Anxiety Scale (panic/ agoraphobia, PIF = Spence Children's Anxiety Scale (physical injury fears), GAD = Spence Children's Anxiety Scale (Generalised Anxiety).

*$p < .05$. **$p < .01$. *** $p < .001$

3.6.8.2 Remission of primary anxiety disorder. Hypothesis 3 predicted that a significantly higher proportion of individuals in the intervention group would demonstrate pre-post remission from their primary anxiety disorder (i.e., would no longer meet their pre-treatment primary diagnosis at post-treatment) compared to adolescents in the waitlist group.

As displayed in Table 10, at post-treatment, there was a significant between-group difference in the number of adolescents who no longer met DSM-IV criteria for a current primary anxiety disorder, χ^2 (1, N = 44) = 5.44, p = .020. Using ADIS-P primary anxiety diagnoses CSRs at post-treatment as the recovery criterion, 72% (18 of 25) of adolescents in the CBT condition no longer met criteria for their primary anxiety diagnosis at post-treatment compared to 31.6% (6 of 19) of those in the WL condition.

Table 10
Number (%) of Participants with a Primary Anxiety Disorder at Pre-treatment/ Post-Intervention Who Demonstrated Remission from the Disorder at Post-Treatment/ Post-Intervention

			Condition Type		
			Treatment	Waitlist	Total
Remission	No remission	Count	7	13	20
		% within Remission	35.0%	65.0%	100.0%
		% within Condition type	28.0%	68.4%	45.5%
		% of Total	15.9%	29.5%	45.5%
	Remission	Count	18	6	24
		% within Remission	75.0%	25.0%	100.0%
		% within Condition type	72.0%	31.6%	54.5%
		% of Total	40.9%	13.6%	54.5%
Total		Count	25	19	44
		% within Remission	56.8%	43.2%	100.0%
		% within Condition type	100.0%	100.0%	100.0%
		% of Total	56.8%	43.2%	100.0%

Note. Only participants with completed ADIS-P post-test outcome measures were included in this analysis.

3.6.8.3 Hypothesis 1b: Depression

Table 11

Adjusted Means and Standard Errors of Outcome Variables at Baseline and Post-test for the Intervention and Control Conditions

	Condition	Time	Condition*Time	Partial	Intervention Condition				Control Condition			
	Effect	Effect	Effect	η2	Baseline	Post-Treatment	*Simple main effects of time*	Cohen's	Baseline	Post-Waitlist	*Simple main effects of time*	Cohen's
					M(SE)	*M(SE)*	*p-value*	*d*	*M(SE)*	*M(SE)*	*p-value*	*d*
SMFQ C	$F(1,79) = 0.12$	$F(1,79) = 0.20$	$F(1,79) = 4.90$	0.06	5.83 (0.64) [a]	8.10 (1.26) [a]	1.39	0.56	7.94 (0.49) [a]	6.48 (0.61) [b]	2.28	0.97
	$p = .729$	$p = .655$	$p = .030$*				0.167				.025*	
SMFQ P	$F(1,83) = 2.67$	$F(1,83) = 47.55$	$F(1,83) = 4.34$	0.05	7.96 (0.80) [a]	5.14 (0.39) [b]	6.66	2.66	8.36 (0.67) [a]	6.94 (0.48) [b]	2.92	1.25
	$p = .106$	$p = .001$***	$p = .040$*									

Note. Change in subscript denotes a significant change between baseline and post-treatment/post-waitlist. Partial η2 = partial eta squared; Sample sizes varies across variables due to missing data. SMFQ-P = short mood and feelings questionnaire – parent (Total).

*$p < .05$. **$p < .01$. ***$p < .001$.

Hypothesis 1b involved the prediction that adolescents in the intervention group would show significantly greater pre-post reductions in levels of depression (as measured by the SMFQ-C, SMFQ-P) compared to the control group. There was a moderate significant Condition x Time interaction for adolescent-reported depression symptomology as assessed by the SMFQ-C (see Table 11). Post-hoc LSD contrasts revealed that while there was no significant pre-post difference for the adolescent self-reports in the CBT group, there was a significant pre-post decrease in depression scores for the waitlist group adolescents (see Figure 10)

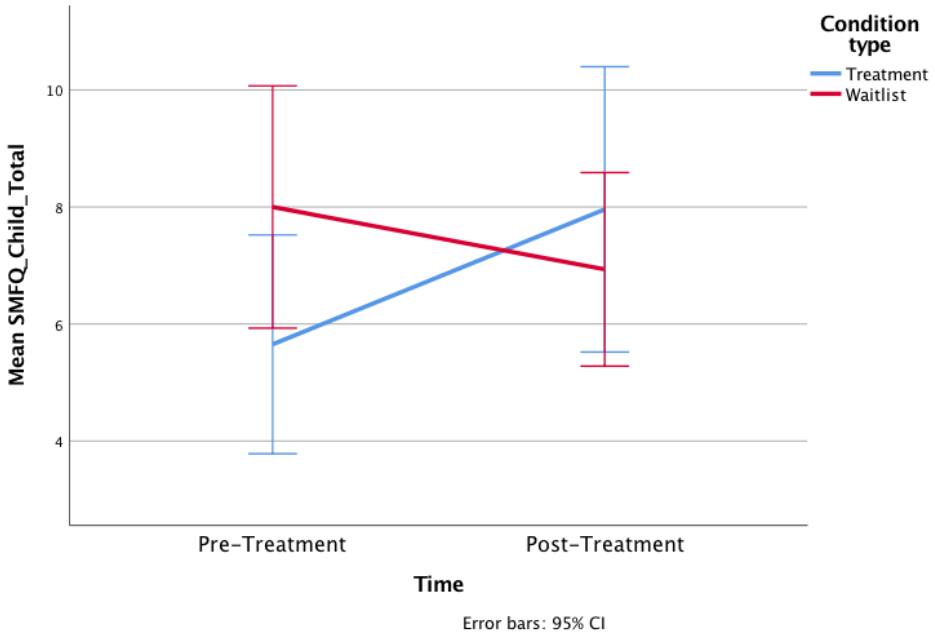

Figure 8. The change in self-reported depression symptomology across time and condition.

In addition, the parent-reported adolescent depression symptomology assessed by the SMFQ-P showed a small significant Condition x Time interaction. As shown in Figure 11, post-hoc LSD contrasts conducted across the simple main effects for time indicated that there was a significant pre-post decrease in parent-reported adolescent depression symptomology for both the CBT and the WL groups.

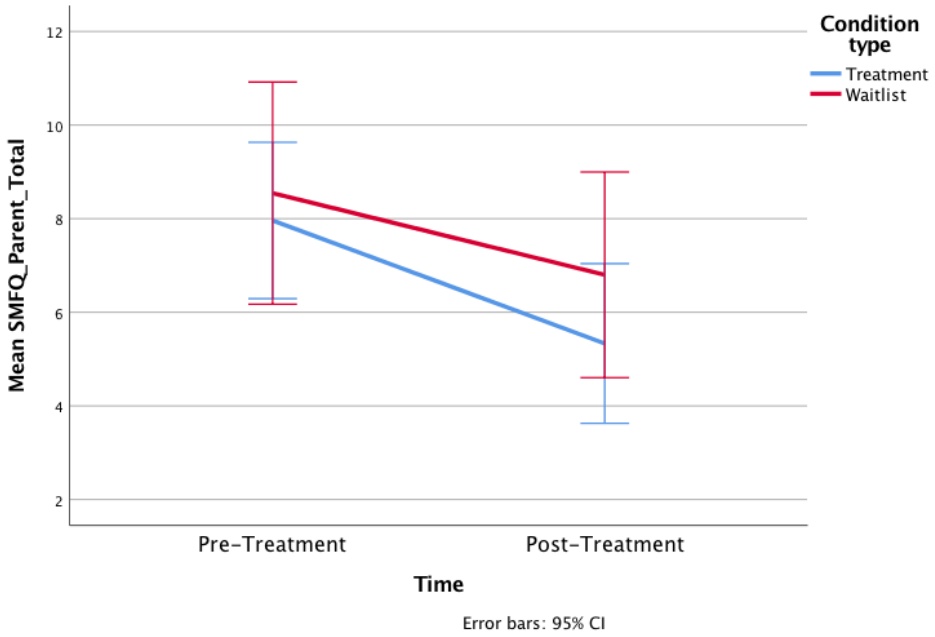

Figure 9. The change in parent-reported Depression symptomology across time and condition

3.6.8.4 Hypothesis 1c: Psychosocial functioning.

Table 12

Adjusted Means and Standard Errors of Psychosocial Functioning at Baseline and Post-treatment for the Intervention and Control Conditions

	Condition	Time	Condition*Time	Partial	Intervention Condition				Control Condition			
	Effect	Effect	Effect	η2	Baseline *M(SE)*	Post-Treatment *M(SE)*	*Simple main effects of time* *p-value*	Cohen's *d*	Baseline *M(SE)*	Post-Waitlist *M(SE)*	*Simple main effects of time* *p-value*	Cohen's *d*
SSIS SS	$F(1,84) = 0.13$	$F(1,84) = 3.58$	$F(1,84) = 0.09$	0	77.96 (1.33) [a]	83.59 (1.74) [b]	2.69	1.08	75.39 (2.82) [a]	82.63 (7.93) [b]	1.27	0.54
	$p = .724$	$p = .062$	$p = .758$				.009**				0.206	
SSIS CPB	$F(1,84) = 0.00$	$F(1,84) = 0.47$	$F(1,84) = 1.96$	0.02	127.76 (1.91) [a]	117.04 (5.48) [a]	1.66	0.66	120.09 (5.48) [a]	123.99 (2.81) [a]	0.5	0.21
	$p = .953$	$p = .493$	$p = .165$				0.101				0.622	
SSIS Aut	$F(1,84) = 1.74$	$F(1,84) = 5.43$	$F(1,84) = 2.66$	0.03	22.73 (0.65) [a]	20.09 (1.08) [b]	2.35	0.94	23.09 (1.08) [a]	22.58 (0.71) [a]	0.78	0.33
	$p = .191$	$p = .022$*	$p = .106$				.021*				0.439	

Note. Change in subscript denotes a significant change between baseline and post-treatment/post-waitlist. Partial η2 = partial eta squared; Sample sizes varies across variables due to missing data. SSIS Autism Raw Score, SSIS SS = The Social Skills Improvement System – Rating Scales (Parent) (Social Skills Standard Score), SSIS CPB = The Social Skills Improvement System – Rating Scales (Parent) Competing Problem Behaviour Standard Score, SSIS Aut The Social Skills Improvement System – Rating Scales (Parent) Autism Raw Score, SMFQ-C = Short Mood and Feelings Questionnaire – child (Total).
*$p < .05$. **$p < .01$. ***$p < .001$.

Hypothesis 1c involved the prediction that adolescents in the intervention group will show significantly greater pre-post increases in levels of psychosocial functioning (as measured by the SSIS-P), compared to adolescents in the waitlist group. As reported in Table 12, there was no significant Condition x Time interaction for parent-reported social skills as assessed by the SSIS-RS. There was also no significant main effect for condition or for time. There was no significant Condition x Time interaction for the subscale, SSIS-RS Competing Problem behaviours, no

significant main effect for condition, and no significant main effect for time. While there was no significant Condition x Time interaction for the SSIS-RS Autism Behaviour raw score and no significant main effect for condition, there was a significant main effect for time, indicating that both groups showed a significant pre-post decrease in autism behaviours.

3.6.8.5 Hypothesis 1d: Family quality of life.

Table 13

Adjusted Means and Standard Errors of Family Quality of Life at Baseline and Post-test for the Intervention and Control Conditions

	Condition	Time	Condition*Time	Partial	Intervention Condition				Control Condition			
	Effect	Effect	Effect	η2	Baseline	Post-Treatment	*Simple main effects of time*	Cohen's	Baseline	Post-Waitlist	*Simple main effects of time*	Cohen's
					M(SE)	*M(SE)*	*p-value*	*d*	*M(SE)*	*M(SE)*	*p-value*	*d*
FQOL	$F(1,83) = 0.55$	$F(1,83) = 0.22$	$F(1,83) = 7.11$	0.08	88.69 (1.43) [a]	93.87 (2.49) [b]	2.37	0.95	95.69 (2.00) [a]	92.07 (4.13) [a]	1.44	0.61
	$p = .461$	$p = .644$	$p = .009$**				.020*				0.153	

Note. Change in subscript denotes a significant change between baseline and post-treatment/post-waitlist. Partial η2 = partial eta squared; Sample sizes varies across variables due to missing data. FQOL Beach family quality of life scale (Total).

*$p < .05$. **$p < .01$. ***$p < .001$.

Hypothesis 1d predicts that parents in the intervention group will report significantly greater pre-post increases in family quality of life (as measured by the FQOL) compared to parents in the waitlist group. Table 13 shows a moderate significant Condition x Time interaction was found for parent-reported family quality of life. Post-hoc LSD contrasts indicated that treatment group parents reported a significant pre-post increase in family quality of life. The waitlist parents did not report a significant pre-post change in family quality of life (see Figure 12 below).

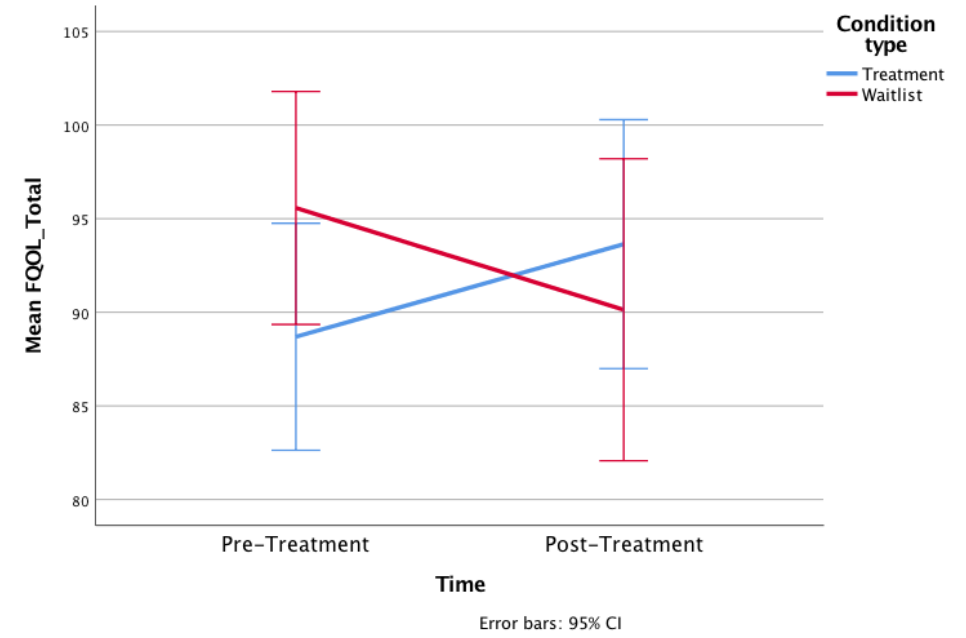

Figure 10. The change in Family Quality of Life across time and condition

3.6.8.6 Hypothesis 1e: Total comorbid diagnoses.

Table 14

Adjusted Means and Standard Errors for the total number of comorbid diagnoses (All ADIS) at Baseline and Post-test for the Intervention and Control Conditions

	Condition	Time	Condition*Time	Partial	Intervention Condition				Control Condition			
	Effect	Effect	Effect	η2	Baseline	Post-Treatment	*Simple main effects of time*	Cohen's	Baseline	Post-Waitlist	*Simple main effects of time*	Cohen's
					M(SE)		*p-value*	*d*	*M(SE)*	*M(SE)*	*p-value*	*d*
						M(SE)						
All ADIS	*F(1,89)= 0 .01*	*F(1,89) = 12.15*	*F(1,89) = 3.18*	0.12	3.99 (0.26)[a]	2.37 (0.45)[b]	3.43	1.37	3.29 (0.15)[a]	2.98 (0.46)[a]	0.72	0.31
	p = .922	*p = .001***	*p = .078*				<.001***				0.476	

Note. Change in subscript denotes a significant change between baseline and post-treatment/post-waitlist. Partial η2 = partial eta squared; Sample sizes varies across variables due to missing data. *$p < .05$. **$p < .01$. ***$p < .001$.

Hypothesis 1e involved the prediction that adolescents in the intervention group would show significantly greater pre-post reductions in the overall number of comorbid disorder diagnoses (as measured by the ADIS-P) compared to adolescents in the waitlist group. Changes in the total number of comorbid diagnoses (e.g., anxiety and other psychiatric conditions based on ADIS-P CSRs), was assessed with no significant Condition x Time interaction occurring (see Table 14). The main effect for condition was non-significant. However, the main effect for time was significant indicating that both groups showed a similar decrease in terms of their total number of comorbid diagnoses from pre-post.

3.6.8.7 Potential predictors of the intervention effect. Age and Gender were tested as potential predictors of the effect of the intervention on the Number of Anxiety Disorders (NOAD). The 3-way Age x Time x Condition interaction was not significant, F (1, 85) = 2.71, p = .103, indicating that age did not predict the intervention effect. Similarly, the 3-way Gender x Time x Condition was not significant, F (1, 85) = 3.82, p = .054, indicating that gender did not predict the intervention effect.

Age and Gender were tested as predictors of the effect of the intervention on the SCAS-P. The 3-way Age x Time x Condition interaction was not significant, F (1, 74) = 1.44, p = .235, indicating that age did not predict the intervention effect. Similarly, the 3-way Gender x Time x Condition was not significant, F (1, 73) = 0.00, p = .997, indicating that gender did not predict the intervention effect.

3.6.8.8 Possible mediators of the intervention effect. A number of correlations were conducted to determine whether a decrease in anxiety results in a reduction of depressive symptomology (SMFQ-C/P), an improvement in social ability (SSIS-SS) and/or an increase in family quality of life (FQOL). Mediator links did not exist between Number of Anxiety Disorders (NOAD) and Primary Anxiety and these measures from pre-post-test and therefore a Path Analysis was not conducted (see Table 15 below).

Table 15
Correlations between anxiety reduction and depressive symptomology, social ability, and family quality of life

		SMFQ_Child_Total	SMFQ_Parent_Total	SSIS_SS	FQOL_Total
NOAD	Pearson Correlation	-.165	.130	-.006	.059
	Sig. (2-tailed)	.316	.432	.969	.716
	N	39	39	40	40
PrimaryAnxiety	Pearson Correlation	-.390	-.101	-.014	-.023
	Sig. (2-tailed)	.110	.689	.956	.928
	N	18	18	18	18

Note: NOAD - Number of Anxiety Disorders (ADIS-P), Primary Anxiety - Primary Anxiety Disorder,
SMFQ – Short Mood and Feelings (Child/ Parent),
SSIS -SS – The Social Skills Improvement System – Rating Scales (Parent) (Social Skills Standard Score),
FQOL Beach family quality of life scale (Total).
*$p < .05$. **$p < .01$. ***$p < .001$.
Baseline and Post-test anxiety disorder is based on ADIS-C/P CSR of 4 or higher.

3.6.9 Maintenance of changes at six-month follow-up.

Table 16

Size and Significance of Change between Pre-treatment, Post-Treatment and Follow-Up for the Intervention Condition

	Time 1	Time 2	Time 3	Time 1 - Time 2		Time 1 - Time 3		Time 2- Time 3		Main	
	M(SE)	*M(SE)*	*M(SE)*	t(df)	Cohen's d	t(df)	Cohen's d	t(df)	Cohen's d	effect of time	Eta^2
NOAD	2.73(0.06)	1.45(0.19)	1.17(0.25)	6.98(72)***	1.95	6.60(72)***	1.68	0.93(72)	0.26	$F(2,72)=47.34$***	0.4
AnxCSRs	2.12 (0.17)	1.02 (0.22)	0.83 (0.18)	5.03 (72)***	1.41	7.40 (72)***	2.07	0.90 (72)	0.25	$F(2,72)=30.08$***	0.46
GAD	4.55(0.69)	1.29(0.28)	0.73(0.37)	4.73(72)***	1.33	5.66(72)***	1.59	1.04(72)	0.29	$F(2,72)=16.67$***	0.19
SP	3.83(0.25)	1.37(0.48)	2.73 (0.76)	9.69(72)***	2.71	2.13(72)*	0.60	3.88(72)***	1.09	$F(2,72)=88.86$***	0.55
SCAS-P	34.96(2.44)	24.71(1.48)	27.73(3.91)	10.44(63)***	2.92	4.60(63)***	1.28	1.20(63)	0.34	$F(2,63)=11.12$***	0.13
SMFQ P	7.97(0.80)	5.19(0.42)	5.97(0.87)	6.87(62)***	1.92	0.29(62)***	0.08	1.40(62)	0.39	$F(2,62)=68.45$***	0.52
FQOL	88.7(2.99)	94.05(3.01)	94.28(3.34)	0.02(640*	0.01	0.04(64)*	0.01	0.93(64)	0.26	$F(2,64)=3.47$*	0.05

Note. NOAD = Number of Anxiety Disorders, AnxCSRs = Anxiety Disorder Interview Schedule – Parent (CSRs for all anxiety diagnoses), All CSRs = Anxiety Disorder Interview Schedule – Parent (all psychiatric diagnoses CSRs), GAD = generalized anxiety disorder, SP = specific phobia, SCAS-P = Spence children's anxiety scale – parent (Total Score), SSIS = SSIS Autism Raw Score, SSIS Social Skills Standard Score, SMFQ-P short mood and feelings questionnaire – parent (Total Score), FQOL Beach family quality of life scale

- NOAD, AnxCSRs, All CSRs, GAD and SP are based on ADIS-C/P CSR of 4 or above
- *p<.05. **p<.01. ***p<.001.

3.6.9.1 Hypothesis 2a: Anxiety. Hypothesis 2a involved the prediction that the significant pre-post reduction in levels of anxiety (as measured by the SCAS-C, SCAS-P, and ADIS-P) observed in the intervention group would be maintained or enhanced at the 6-month follow-up. Table 16 displays the within-group changes on the primary and secondary outcome measures that showed significant pre-post change for the intervention group. The aim of the first follow-up analyses was to determine whether maintenance of treatment gains, for the CBT group only, occurred at 6-months follow-up. For the Number of Anxiety Disorders, a significant main effect of time was found and a significant pre-treatment to 6-month follow-up reduction was found but no significant post-intervention to 6-month follow-up change (see Figure 13).

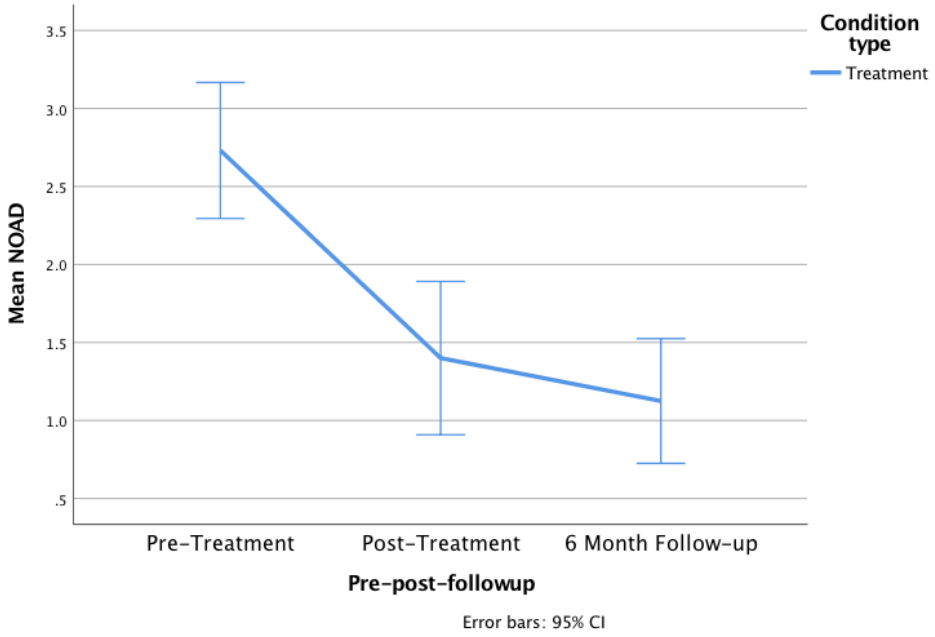

Figure 11. Changes in the number of anxiety disorder diagnoses from pre-post-follow-up for the Intervention group.

Using ADIS-P primary anxiety diagnoses CSRs at post-treatment as the recovery criterion, treatment gains were maintained at follow-up (see Table 15). At 6-month follow-up, 79.2% of CBT adolescents demonstrated remission of their baseline primary anxiety disorder diagnosis. That is, at 6-month follow-up, 19 adolescents in the CBT group no longer met criteria for their primary anxiety disorder.

Table 17
Percentage of Participants without a Current Primary Anxiety Disorders at Pre-

treatment (n = 26) Post-treatment (n = 25) and Follow-up (n= 24) for the CBT Condition

		Time		
		Pre-Treatment	Post-Treatment	6 Month Follow-up
Primary Anxiety	SOCP	8 (0%)	6 (24%)	2 (8.3%)
	GAD	9 (0%)	1 (4%)	1 (4.2%)
	SP	8 (0%)	0 (0%)	2 (8.3%)
	OCD	1 (0%)	0 (0%)	0 (0%)
Total		26 (0%)	7 (28%)	5 (20.8%)
Count % within remission		0 (0%)	18 (72%)	19 (79.2%)

Note. ADIS-P Anxiety Disorder Interview Schedule – SOCP social anxiety disorder, GAD, generalised anxiety disorder, SP specific phobia, OCD obsessive compulsive disorder. Baseline, Posttest and Follow-up anxiety disorders are based on ADIS-C/P CSR of 4 or higher.

The significant decreases in severity using the Clinical Severity Ratings (CSR) values from baseline to follow-up across all ADIS-P anxiety disorders, were maintained at follow-up as shown in Table 16 (AnxCSRs). There was no significant post- to 6-month change indicating maintenance of the post-test effect.

In regard to CSR values for individual anxiety disorders, there was a significant main effect of time for GAD in the CBT intervention group, with post-hoc LSD contrasts revealing a significant pre- to 6-month decrease in generalised anxiety disorder symptomology (see Table 16 and Figure 14). There was no significant post- to 6-month change.

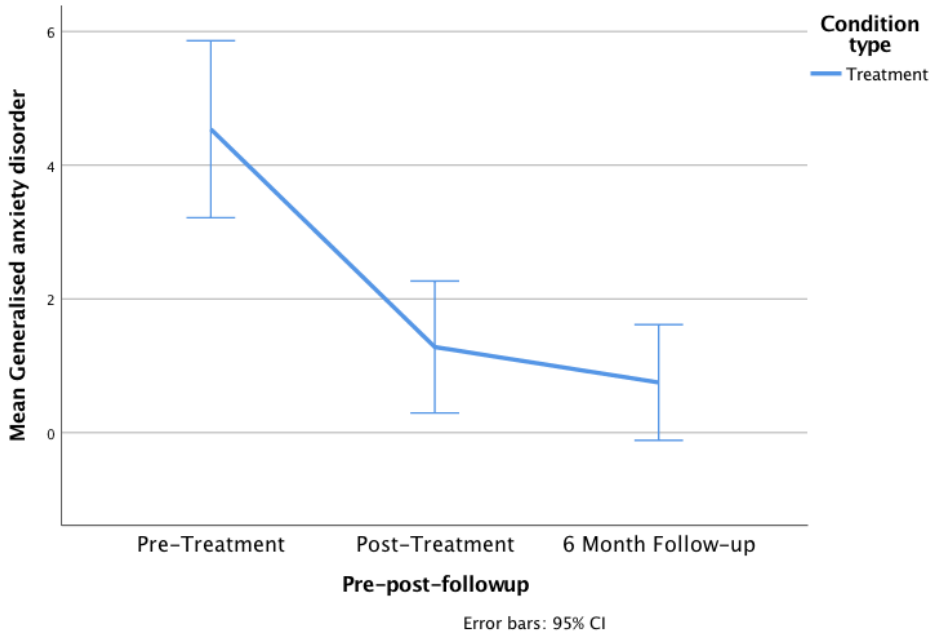

Figure 12. The change in symptoms of GAD across time for the intervention group.

For Specific Phobia (as seen in Table 16 and Figure 15), there was a significant main effect of time. Post-hoc LSD contrasts indicated that, for the CBT intervention group, there was a significant pre- to 6-month follow-up decrease. There was also a significant post- to 6-month follow-up increase. This suggests that while participants significantly reduced in specific phobia from pre- to posttreatment and from pre- to follow-up, specific phobia symptomology had significantly increased by follow-up.

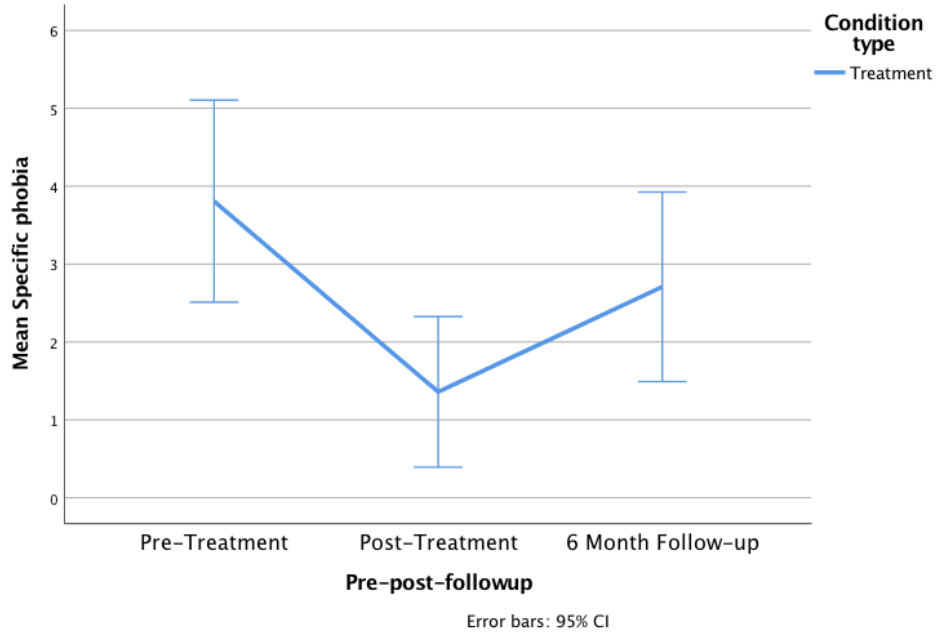

Figure 13. The change in symptoms of specific phobia across time for the intervention group.

As observed in Table 16 there was a significant main effect of time for the SCAS-Parent (Total Score). There was no significant post-treatment to 6-month change in anxiety as assessed by the SCAS-P. That is, parent-rated treatment gains for anxiety reduction were maintained at 6-month follow-up (see Figure 16 below).

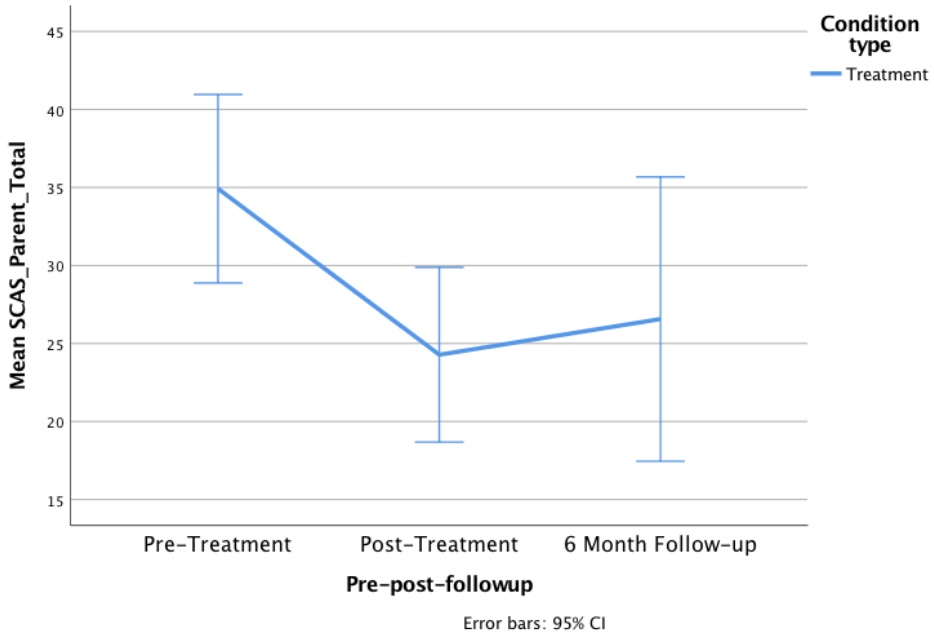

Figure 14. *The change in parent-reported symptoms of adolescent anxiety across time for the intervention group*.

3.6.9.2 Hypothesis 2b: Depression. Hypothesis 2b involved the prediction that the significant pre- to post- reduction in levels of depression (as measured by the SMFQ-P) that were observed in the intervention group would be maintained or enhanced at the 6-month follow-up.

For the SMFQ Parent measure, there was a significant main effect of time (see Table 16 above and Figure 17 below). There was a significant pre-to-6-month decrease in symptoms of depression. That is, parents reported significantly less depression symptomology for the adolescents in the CBT group. There was no significant post-6-month change.

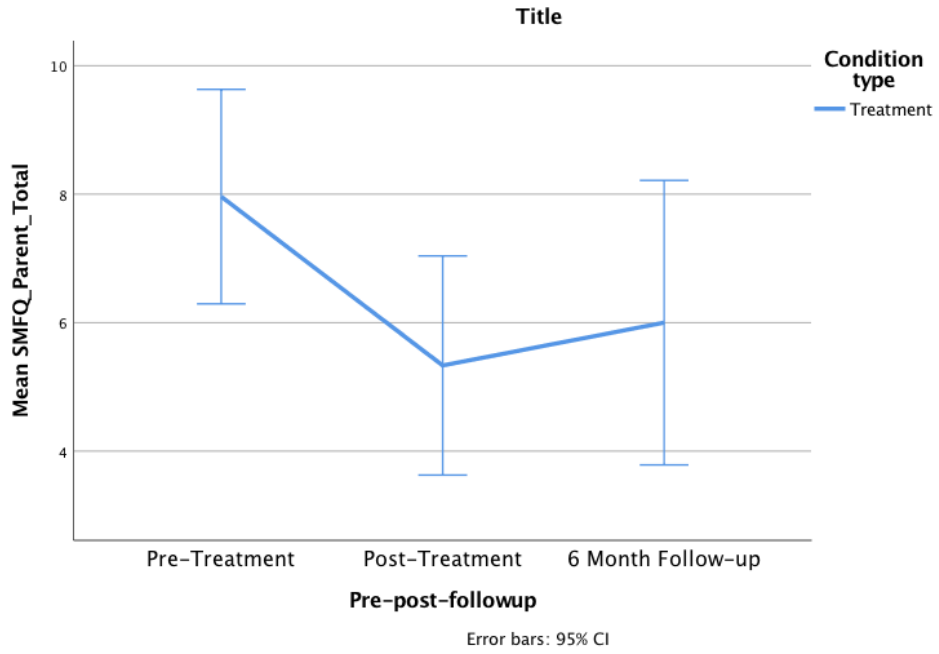

Figure 15. The change in symptoms of depression across time for the intervention group.

3.6.9.3 Hypothesis 2d: Family quality of life. Hypothesis 2d involved the prediction that the significant pre-post improvement in levels of family quality of life (as measured by the FQOL) that was observed in the intervention condition was maintained or enhanced at the 6-month follow-up.

In assessing Family Quality of Life (Beach Center Family Quality of Life Scale), there was a significant main effect of time for the CBT intervention group (see Table 16 and Figure 18). There was a significant pre- to 6-month increase in parent-reported family quality of life over time. Once again, there was no significant post- to 6-month change.

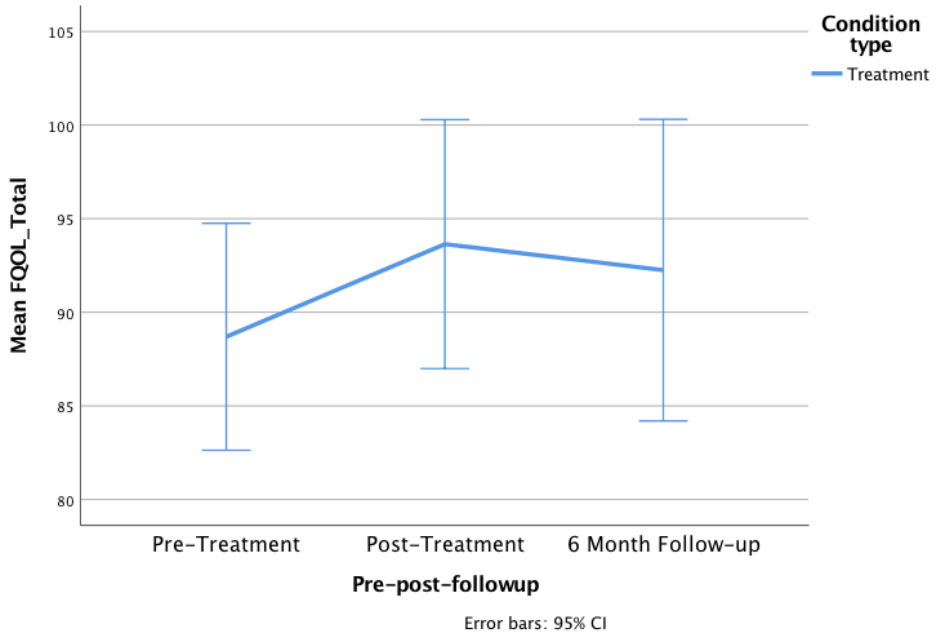

Figure 16. The change in Family Quality of Life (FQOL) across time for the intervention group

3.6.9.4 Hypothesis 4: Reliable change. Hypothesis 4 involved the prediction that a significantly higher proportion of adolescents in the intervention condition would show a pre- to post reliable reduction in anxiety. Reliable change scores were computed for both the SCAS Child and Parent measures to ascertain both reliable change and clinically significant change in anxiety symptomology. Using these indexes as a basis, adolescents were grouped into those whose symptoms had worsened (Deterioration), those who had failed to evidence change (No Change), those whose symptoms had improved (Improvement) and those that had demonstrated recovery from anxiety symptomology (Clinically Significant Change and Reliable Change). If the latter, a participant's pre-intervention score sat above the clinical cut-off and a post-intervention score sat below the cut-off. Table 10 displays the number and percentage of individuals from the CBT and WL condition who experienced reliable change on outcome variables. Due to missing data only participants who had completed pre- and post-measures were included. Criterion C (see Data Analysis section) was used as the cut off score. Fisher's exact 1-sided tests indicated that a significantly greater proportion of participants in the CBT group demonstrated reliable change in the total scores on the SCAS-P compared to WL control participants, (p = .041). There were no significant differences in the proportion of cases demonstrating pre- to post- reliable change across the CBT and WL groups for the SCAS-C (p = .584). Table 18 additionally includes change for CBT participants from pre-follow-up.

Table 18
Proportions of Reliably and Clinically Improved Families for each Outcome Measure for the Intervention and Waitlist Groups

		T1 - T2		T2 - T3	T1 - T3
		Intervention	Waitlist	Intervention	Intervention
SCAS-P					
Total Score	Deterioration	1 (4%)	3 (19%)	1 (5.5%)	0 (0)
	No Change	10 (38%)	8 (50%)	12 (71%)	12 (64%)
	Improvement	12 (46%)	4 (25%)	3 (18%)	4 (21%)
	Clinically Significant Change	3 (12%)	1 (6%)	1 (5.5%)	3 (15%)
SCAS-C					
Total Score	Deterioration	4 (15%)	2 (11%)	0 (0)	0 (0)
	No Change	15 (58%)	15 (83%)	11 (57%)	10 (56%)
	Improvement	6 (23%)	1 (6%)	5 (26%)	5 (27%)
	Clinically Significant Change	1 (4%)	0 (0)	3 (17%)	3 (17%)

Note. Sample sizes varies across variables due to missing data
SCAS-P = Spence Children's Anxiety Scale – Parent, SCAS-C Spence Children's Anxiety Scale – Child

3.6.9.5 Hypothesis 5: CGI-I improvement ratings. Hypothesis 5 involved the prediction that adolescents in the intervention group would show a significant reduction in anxiety severity from pre-intervention to 6-month follow-up (as measured by CGI-I Improvement Scores).

Independent clinical evaluators compared each participant's overall condition at post-intervention to their pre-intervention assessment. The query they responded to was:

> "Compared to the patient's condition at admission to the project… this patient's condition (since pre-test) is: 1 = very much improved; 2 = much improved; 3 = minimally improved; 4 = no change from baseline; 5 = minimally worse; 6 = much worse; 7 = very much worse since the initiation of treatment" *(Busner & Targum, 2007, p. 30-31)*.

A clinical improvement in anxiety severity was reflected in scores of 1 and 2 based on the independent clinical evaluator assessment at post-test (see figure 4 in Measures Section). These were derived from the presence and frequency of relevant symptoms over the study period, how severe or intense the symptoms were, and the manner in which the symptoms are impacting on daily functioning in the main areas of the adolescent's life, such as relationships, school, home, and work (Busner & Targum, 2007).

Due to participant attrition only participants that had completed pre- and post-intervention measures were included and given CGI-I ratings. It was preferable for the same independent clinical evaluator completed the pre- and post-intervention ADIS-P interview in order to glean an overall clinical picture of the participant. For the CBT group, 20 of 25 adolescents (60%) were rated as positive treatment responders compared to 3 of 19 (11%) adolescents in the WL group (χ^2 [1, N = 44] = 17.84, p < .001). At follow-up, 21 of the 24 CBT group adolescents reflected scores of 1, 2 or 3, indicating that 75% of participants had very much improved (recovered), much improved, or minimally improved in their overall psychiatric well-being over time (see Table 19).

Table 19
Treatment Response Demonstrating Clinical Improvement in Anxiety Across Time

Condition		Very Much Improved	Much Improved	Minimally Improved	No Change	Minimally Worse	Much Worse	Very much worse	Total
Post-test	CBT	8 (32%)	7 (28%)	5 (20%)	5 (20%)	0 (0)	0 (0)	0 (0)	25
	WL	0 (0)	2 (11%)	1 (5%)	9 (47%)	6 (32%)	1 (5%)	0 (0)	19
Follow-up	CBT	10 (42%)	8 (33%)	3 (12.5%)	3 (12.5%)	0 (0%)	0 (0%)	0 (0)	24

Note. CBT – Cognitive behavioural therapy treatment group, WL – Waitlist group. Based on parent-reported assessments at Baseline, Posttest and Follow-up on ADIS-C/P CSR of 4 or higher.
*one lost at follow-up.

3.6.9.6 Parent-child reports. Due to low agreement between parent and child reports in previous ASD studies (e.g., Blakely-Smith et al., 2012; Mazefsky et al., 2011), intra-class correlation between child and parent reports were conducted. The SCAS at pre-intervention was .70 ($p < .001$) indicating a moderate to strong relationship between the two reports (Portney & Watkins, 2008). The intra-class correlation between child and parent reports on the SMFQ at pre-test was .57 ($p < .001$) which indicates a moderate relationship between the two reports.

3.6.9.7 Results summary. In summary, there were four main findings. First, the results indicate that adolescent anxiety reduced significantly across time for the CBT condition but not for the WL condition. This was determined by parent and adolescent reports, diagnostic status and clinical independent evaluators. Second, parent-reported depression symptomology reduced for both groups over time, however there was only a decrease in adolescent self-reports of depression symptomology for the WL group. Third, there were no changes in competing problem behaviours, social skills, or autism behaviours for adolescents, as assessed by the SSIS-RS parent-reports. Fourth, there was a significant increase in parent-reported family quality of life for the CBT group over time but not for the WL group. In addition, for the CBT group, treatment gains were maintained at the 6-month follow-up.

3.7 Discussion

3.7.1 The effect of group CBT on anxiety. Similar to previous research with an ASD population (i.e., McConachie et al., 2014), the most frequently occurring anxiety disorder diagnoses at baseline in the current study were social phobia (40, 82% of entire sample), generalised anxiety disorder (33, 67%) and specific phobia (24, 50%). These findings are not dissimilar to research involving typically developing youth which suggests that social phobia shows an abrupt incline in adolescence (Beesdo-Baum & Knappe, 2012) and GAD a high onset period during later adolescence and early adulthood. In the current study, social phobia, GAD, and specific phobia were also the most frequent primary anxiety disorders. This fits with researchers finding that adolescents with ASD tend to engage in more avoidant behaviours and demonstrate increased social anxiety with age compared to typically

developing peers where avoidant behaviours are seen to decrease (Kuusikko and colleagues, 2008).

In addition to previous research demonstrating that CBT can reduce anxiety in children with ASD (e.g., Chalfant et al., 2007; Reaven, Blakely-Smith, Culhane-Shelburne, et al., 2012; Sofronoff et al., 2005; Sung et al., 2011; Wood et al., 2009), it was anticipated that participants randomised to receive group CBT in the current study would demonstrate significantly greater reductions in measures of anxiety compared to participants in the waitlist condition. A number of areas were studied to assess the efficacy of the *Chilled Program* intervention: (a) change in anxiety severity and interference of primary anxiety diagnoses (b) change in diagnostic status of primary anxiety diagnoses; (c) change in the number of anxiety diagnoses, (d) change in Total SCAS-C/P scores (e) global rating of improvement in anxiety (CGIS), and (f) evidence of reliable and clinically significant change in anxiety symptomology. Examination of the hypotheses (H1a, H2a and H3, H4 and H5) revealed support for the efficacy of the *Chilled Program* and anxiety symptomology reduction. Group CBT produced a large reduction in the total number of anxiety disorder diagnoses, anxiety symptomology on the SCAS-Parent measure, and remission of primary anxiety disorder diagnoses. Moderate effect sizes were found for the Clinical Severity Ratings for generalised anxiety disorder and specific phobia. There was no significant Condition x Time effect at post-treatment/ waitlist on the adolescent self-reports (SCAS-C) however, there was a significant reduction in anxiety on this measure from pre-treatment to follow-up for the CBT group. However, without a comparison group, this finding cannot be attributed to the intervention. In addition, post-treatment decreases in all anxiety measures were maintained at 6-month follow-up. These findings support group CBT producing lasting decreases in clinical anxiety and related measures of anxiety symptomology. Lengthening follow-up assessments to one or two years post-intervention would provide useful information as to whether treatment gains are maintained beyond this point, and whether booster sessions are useful or necessary in fully maintaining skills learned in the primary intervention phase.

The finding of group CBT producing significantly greater changes in anxiety scores when compared to a waitlist group is in accordance with findings from Chalfant et al's. (2007) RCT using the *Cool Kids ASD* anxiety program with 8- to 13-year-olds with ASD. In their study, 71.4% of children no longer met criteria for a current primary anxiety disorder at post-treatment, similar to the 72% of CBT participants in the present study. However, 30% of the waitlist participants in the present study also lost

their primary anxiety disorder diagnosis whereas none of the participants waiting for treatment in Chalfant's et al. (2007) study did. In similar studies remission rates have included: 32% in treatment and 21% in waitlist; Wood et al. (2014); 58% treatment, 0% waitlist; McNally et al. (2013); and 17.65% in treatment completers; Ehrenreich-May et al. (2014). In a systematic review of CBT studies for anxiety disorders in typically developing adolescents, Cartwright-Hatton, Roberts, Chitsabesan, Fothergill, and Harrington (2004) found the remission rates were 56.5% in the CBT groups and, similar to the present study, 34.8% in the control groups, proposing that CBT has a significant effect. In both the present study and the Chalfant et al. (2007) original study of the *Cool Kids* ASD program, the number of anxiety disorder diagnoses significantly reduced for the intervention groups but not for the waitlist groups from pre- to post-treatment. This implies that CBT is an effective treatment for anxiety in ASD youth.

There was a statistically significant reduction in GAD diagnoses and specific phobia diagnoses in the treatment group in the present study. Reaven and colleagues (2012) reported similar findings for GAD in their study but not for the remaining principal diagnoses. Contrasting results were found by Wood et al. (2014) who suggested that there may exist challenges with treatment motivation in participants with a sole diagnosis of GAD. These researchers questioned whether highly complex psychiatric presentations of their adolescent participants (between 2 to 7 psychiatric diagnoses in addition to ASD) may have interfered with successful anxiety reduction treatment gains. However, the participants in the current study demonstrated similar presentations on the ADIS-P (2 to 6 psychiatric diagnoses in addition to ASD). Interestingly, there was no significant change in the second most frequently occurring primary diagnosis disorder for the CBT group, social phobia disorder (8 CBT participants at pre-intervention, 6 at post-intervention, and 2 at follow-up had a primary diagnosis of social phobia). This may fit with the conclusion of Hudson and colleagues (2015) that children and adolescents of typical development showed a slower rate of change and poorer outcomes in diagnostic status if they had a primary anxiety diagnosis of social anxiety disorder. This finding may also contribute to explaining why there was no significant changes in social functioning for the participants in the current study. Future studies, using long term follow-up for both conditions, could investigate whether individuals with ASD who have a primary diagnosis of social phobia do take longer to respond to CBT treatment.

While both the CBT and WL conditions were equivalent in their SCAS anxiety levels at baseline, the mean levels of parent-reported adolescent anxiety on SCAS-P

were higher for the CBT group than for typically developing children with an anxiety disorder (*M*= 32, *SD* = 14; Nauta et al., 2004), but not for the WL group. The SCAS-C means of adolescent-reports in this study were noticeably lower than the children in Chalfant and colleague's (2007) study. Whether adolescent reporting of anxiety occurs differently than that of children could be an area for further study. In contrast to parent-rated symptomology, there were no significant changes in adolescent-rated anxiety using the SCAS. This may fit with current research that has found discrepancies between ASD parent and youth SCAS reports to be higher than in typically developing populations (May et al., 2015). However, no significant discrepancy between adolescent and parent reports was found in the present study. There was a significant difference between the CBT and WL groups on all of the SCAS-P subscales, except for social phobia subscale whereby the WL group increased in symptoms at post-waitlist. There was a large effect size for reduction in anxiety symptomology for the CBT group on all SCAS subscales which indicates that the program was effective in treating anxiety in adolescents with ASD.

Considering the overall complex psychiatric presentation of adolescents in this study, the demonstrated treatment gains on the anxiety outcome measures which were all maintained at 6-month follow-up are worth highlighting. These findings support the literature whereby similar results have been established for group CBT in children with ASD, and for individual or multimodal CBT with adolescents with ASD. Since children and early adolescents have received more attention, these findings add to the literature base given that 43% of adolescents in the current study were aged between 15-18 years. With only minor changes made to the original *Cool Kids ASD* anxiety program, these findings demonstrate that group CBT with a complete focus on anxiety reduction can lead to positive treatment outcomes in older adolescents.

3.7.2 The effect of group CBT on depression. With the suggestion that adolescents and young adults with ASD are at risk for severe depression (Boyd, Woodbury-Smith, & Szatmari, 2011), this study also investigated whether a reduction in depression symptomology using the SMFQ would occur following CBT. It was predicted that these symptoms would reduce in the CBT group however, this hypothesis was only partially supported. This is not surprising given that anxiety was the treatment focus. The WL adolescent participants reported a large reduction in depression symptoms whereas parents in both conditions reported significant reductions in adolescent depression symptoms. The absence of significant reductions for adolescents who received CBT cannot be attributed to the commonly reported

discrepancies between parent and child reports (Sukhodolsky et al., 2013) since previous studies have found that both intervention and control condition participants have reported reduced symptoms in studies (McConachie et al., 2014; Wood et al., 2009). Researchers continue to question the accuracy of youth reporting. For example, Sofronoff et al. (2005) and colleagues (2005) made the decision to discontinue child self-report after baseline, questioning its validity with this client group. Likewise, in a meta-analysis, Weston, Hodgekins, and Langdon (2016) found that in contrast to informant and clinician-reported measures, self-report measures failed to be reliably associated with significant change in affective symptomology. However, similar to the current study, McConachie et al., (2014) found a high correlation between child and parent reports, on the SCAS measure in their study which tends to suggest that youth with ASD do have the capacity to report independently about their feelings.

In the current study, WL group participants reported a decrease in depression symptoms, as did their parents. A possible reason for this may be associated with participants knowing that they would be receiving treatment and therefore a reduction in feelings of hopelessness and an increase in expectations for change may have resulted. Certainly there has been reports of improvements in symptomology during waiting periods in previous studies (e.g., Lowry-Webster, Barrett, & Dadds, 2001; Roberts et al., 2010; Smith, Yule, Perrin, Tranah, Dalgleish, Clark, 2007). For example, due to the small sample size in their study, Mcgillivray & Evert, (2014) suggested that a sizeable improvement in one of their participants in the WL condition could have influenced a significant reduction in depression symptomology at post-test for their WL condition. In addition, in a non-ASD study by Smith and colleagues (2007), 50% of the WL control condition participants lost their PTSD diagnostic status by the end of the waiting list period. Likewise, a study by Jordans et al. (2010) found that children in both a psychosocial intervention condition and a WL control condition reported significant pre-post improvements in SDQ, PTSD and anxiety scores. These studies provide evidence for waitlist improvements however, given that similar findings were not observed on the other adolescent measure in the current study (SCAS-C), it is difficult to understand why this occurred for the depression measure only. Further research is needed to ascertain the relationship between depression, anxiety and ASD.

For the CBT group participants, focusing on anxiety and attending group sessions could have increased such feelings or helped the adolescent to recognise and identify internalising feelings, and therefore more likely to report them. Although there

were not any significant differences between their pre-and-post scores. While not significantly different, the CBT group did present with lower SMFQ-C scores at pre-test (M = 5.65) compared to the WL group adolescents (M = 8.00) and as such perhaps having less symptomology meant they had less symptoms related to depression to lose over time. However, while only a small number, more adolescents in the CBT group (n = 6) were found to have a comorbid mood disorder on the ADIS-P then adolescents in the CBT group (n = 3) at pre-test. Since this was a fairly inadequate sample size in terms of depression comorbidity, further research is needed to ascertain the relationship between depression, anxiety and ASD. For example, did the intervention participants gain greater insight to how they were feeling and consequently reported higher depressive symptomology? Does CBT have an adverse effect on depression symptoms? It may be that a longer follow-up period could better track depression onset. With CBT parents reporting significant reductions in symptoms of depression it would be useful to identify whether specific CBT components lead to reductions in depression symptoms in youth with ASD and comorbid clinical depression. In addition, whether the SMFQ is an appropriate measure for individuals with ASD is still in question although it has been used successfully in a number of ASD studies (Andersen et al., 2015; Mazefsky et al., 2014).

3.7.3 The effect of group CBT on social skills. In the current study, using the SSIS-RS to measure social functioning, no significant increase in adolescent's social skills was found. It has been suggested that there is a bidirectional relationship between anxiety and social functioning (White et al., 2013) and as such it was anticipated that a decrease in anxiety would result in improvements in social functioning; however, no correlation was found for this hypothesis. Therefore, as previously mentioned, anxiety reduction and social skills may need to be targeted in separate programs. With mixed results deriving from prior evaluations targeting both social skills and anxiety (Binnie & Blainey, 2013; White et al., 2013), further research is needed to determine whether focusing on either anxiety or social skills is more time and cost effective. There was no significant difference between the two groups for the Competing Problem Behaviours standard score or in Autism Behaviours. These findings do not reflect those of Wood and colleagues (2014) who suggest that core ASD deficits may be ameliorated by CBT intervention for some young people with ASD. Identifying the components that may contribute to such findings, and whether there are types of

individuals with ASD/ presentations that respond more successfully to CBT treatment remains to be explored.

3.7.4 The effect of group CBT on family quality of life. Based upon arguments that the comorbid presentation of ASD and clinical anxiety is likely to negatively impact parent mental health and the quality of life within families (e.g., Ooi et al., 2008), it was anticipated that a decrease in adolescent anxiety would increase family quality life. Support for the hypothesis that families attending the CBT intervention would report significant increases in parent-reported family quality of life from pre- to post-intervention compared to the WL families, was found. This is the first anxiety-targeted RCT for children and/ or adolescents with ASD to investigate family quality of life, and to demonstrate some longevity in this outcome at 6-month follow-up. Previous RCTs using group CBT for this client group have not investigated the effect of CBT treatment on family quality of life (Chalfant et al., 2007; White et al., 2013; Wood et al., 2014). This finding therefore makes a novel contribution to the existing body of literature and has clinical implications for practitioners who may adopt a similar approach. In addition, it has the potential to enhance everyday life for both adolescents and their families, in addition to strengthening the relationships they have with each other. The current study did not measure parent mental health although this is recommended for future studies.

3.7.5 Reliable and clinically significant change. It is important for clinical practitioners to ascertain the extent to which an individual has improved following treatment. Reliable and clinically significant change has proven an effective method for deriving this information in the typically developing population. In the present study, it was predicted that changes in anxiety would not only occur at a group level but also at an individual level (Jacobson & Truax, 1991). In accordance with this prediction, significantly more adolescent participants in the CBT group exhibited reliable change in anxiety SCAS-C/P (Total Scores) than participants in the WL group. Such results suggest meaningful changes in individual adolescents, including older adolescents with ASD, following CBT. The proportion of participants in the CBT group that achieved reliable and clinically significant change based on the SCAS-P (n = 12, 48%) was more than double the number of participants in the WL group demonstrating such change (n = 4, 21%). These gains were maintained at 6-month follow-up with half of the CBT group participants making reliable improvement. Based on the SCAS-C a larger proportion of participants met reliable change (n = 6,

24%) in the CBT group compared to the waitlist group (*n* = 1, 7.1%), with similar deterioration rates. Sung and colleagues (2011) measured anxiety reduction using this measure and found a similar number of adolescent participants in their study reached reliable change after receiving CBT. However, many more of their CBT participants achieved clinically significant change by follow-up (*n* =13, 44.83%) in comparison to those in the current study (*n* = 3, 12%).

To date, very few studies have used the reliable and clinically significant change measure with the ASD population. McGillivray & Evert (2014) suggest that clinicians should refrain from using Jacobson and Traux's (1991) calculations with measures that haven't been widely used in research with people with ASD. A knowledge of distribution of scores and return to normal function for this population, as well as normative data, is required to calculate the statistic for reliable and clinically significant change (Mcgillivray & Evert, 2014). Therefore, while results from this calculation should be viewed with caution, it may be useful for future researchers to use the reliable and clinically significant change measure when studying anxiety reduction in youth with ASD in order to gain comparative data. The majority of researchers in this area have tended to report overall psychiatric Clinical Global Improvement rather than measuring change of a specific clinical problem at an individual level.

3.7.6 Clinical Global Impression Scale – Improvement. The CGI-I is a useful and established clinical rating tool that allows clinicians to track participant progress and treatment response (Busner & Targum, 2007; Kelly et al., 2010). In the present study, improvements in overall psychiatric severity were assessed based on the CGI-I with a significant difference found between conditions. Sixty percent of participants in the CBT condition showed improvements on the CGIS-I compared to 11% of participants in the WL group. A number of waitlist participants (*n* = 7, 37%) demonstrated worsening of symptomology whereas none of the CBT group did. Some researchers have observed a reduction in treatment response from post-treatment to follow-up (e.g., Selles et al., 2014) but in the present study, 75% of CBT adolescents demonstrated improvement in overall symptomology at 6-month follow-up. These findings are consistent with previous studies involving adolescents with ASD. For example, Wood et al. (2014), in their individual CBT study of 11- to 15-year-olds, found 79% of their CBT group met positive treatment response compared to 28.6% in their waitlist group, despite no significant differences between conditions in diagnostic remission. Following an open trial, Ehrenreich-May et al. (2014), found 76.5% of

participants (11- to 14-years-of-age) achieved responder status following CBT treatment. Likewise, in a modular individual CBT intervention of 11- to 16-year-olds, 68.8% of adolescents in the CBT group were treatment responders, compared to 26.7% of those in a "Treatment as Usual" group (Storch et al., 2015).

In their open trial, Ehrenreich-May and colleagues (2014) found a discrepancy between diagnostic remission of primary anxiety for participants (11- to 14-years) at post-treatment and follow-up, and treatment responder status on the CGI-I. A higher percentage of adolescents were determined treatment responders on the CGI-I at these assessment points. Similar findings have been observed in studies on typically developing youth following CBT (for example, Ginsburg et al., 2011). Following intervention in the present study, less participants achieved diagnostic remission of their primary anxiety disorder than treatment responder status on the CGI-I however this discrepancy was minimal. Given that the CGI-I evaluates overall psychiatric improvement, it could be suggested that with a reduction in anxiety, other psychiatric symptomology is more likely to reduce and overall functioning is more likely to improve. For example, the reduction in depressive symptomology as reported by parents, and an increase in family quality of life that was observed following anxiety treatment could have assisted with increasing overall functional behaviour for participants in the CBT group.

Ehrenreich-May et al. (2014) proposed that the discrepancy between the number of treatment responders and those that achieve a remission of their primary anxiety disorder could derive from (a) differences between the specific distress and severity of anxiety symptomology as reported by parents on the ADIS-P CSRs, and (b) the perception of overall improvement from baseline to post-treatment/ follow-up on the CGI-I as viewed by both parents and independent clinical evaluators. These authors suggested the possibility that early adolescents with ASD may be less likely to lose their anxiety diagnosis following CBT, than children with ASD, however the current study indicates that this may not be the case, with 72% of CBT participants demonstrating diagnostic remission (79.2 % by follow-up). These findings, along with the current study results, strongly suggest that CBT for some adolescents with high functioning ASD can increase psychiatric well-being. More specifically, taking into considerations the study limitations below, it can be suggested that the *Chilled Program* was highly effective, and likely to be as efficacious as individual CBT in reducing psychiatric symptomology for adolescents, including older adolescents with ASD.

In contrast, results from the waitlist participants suggest that non-treatment is not a viable option with 37% of this group worsening in symptoms.

3.7.7 Mediators and moderators. Despite being powered to detect clinical main effects, the current study was not powered to determine any treatment mediators and moderators (Storch et al. 2015). Future, large-scale, multi-site intervention studies, with multiple assessment points are needed to assist with revealing mediators and moderators of anxiety treatment for this population.

3.7.8 Strengths of this study. The current study included a number of strengths. First, extending CBT intervention targeting anxiety to older adolescents with ASD, who have been underrepresented in RCTs. Second, this study attempted to include some of the components suggested as future research inclusions in Chalfant and colleagues (2007) study. For example, this therapists video recorded all therapy sessions to enable coders to evaluate treatment integrity. In addition, independent and blinded clinical evaluators conducted the pre-, post-intervention, and follow-up measures. As suggested by Chalfant (2007) and Ooi et al., (2011), family quality of life was assessed, as were measures of social skills (Chalfant et al., 2007). In addition, the current study conducted follow-up measures which were not reported on in the original *Cool Kids ASD* adaptation study (Chalfant et al., 2007). Finally, drop-out study participation rates were low (CBT, $n = 1$; WL, $n = 4$).

3.7.9 Limitations of this study. Despite the significant and positive findings, the sample size was small, contributing to reduced power. This has been a common problem across all CBT studies in this area (Weston et al., 2016). In a meta-analysis of studies using CBT with people on the autism spectrum, Freitagand colleagues (2016) were found to include the largest participant group (CBT = 101; Control = 108) however their study focus was social responsiveness as opposed to anxiety. There is a critical need for large scale RCTs employing CBT to target anxiety across the lifespan. The participants in this study represented a rather ethnically homogenous group, which may limit generalisability of findings and could mean that the participants in this study do not accurately reflect the wider population of anxious adolescents with ASD (Chalfant et al., 2007). In addition, some methodological limitations in the current study include the absence of homework compliance and participant involvement data, and stringent recording of medication dosages. Some researchers have recorded the failure or extent to which participants have completed treatment home practice tasks between sessions (White et al., 2010), participant's engagement within sessions

(White et al., 2013), as well as requiring participants to record medication status on a weekly basis during therapy sessions (Reaven et al., 2014). It is possible in the current study that the independent clinical evaluators did not elicit medication information from parents at every assessment time point. In addition, parents may not have volunteered or recalled changes to medication status and dosages over a five or six-month period. It is therefore likely that more than the one recorded participant in this study changed medication dose over the study period. For example, in the White et al. (2013) study over half of the participants changed medication doses over the course of the intervention/waitlist period even though they had been asked to remain on a stable dose prior to study commencement. Future studies can provide parents with a measure to frequently assess adherence to medication change and engagement in external psychotherapy.

A further limitation of the present study is the absence of follow-up measures by the waitlist group at 6-months. More recently it has been suggested that "treatment as usual" or active control groups are preferable over waitlist groups. Active control groups can discern whether treatment gains are attributed to contact time with the therapist or session structure rather than the treatment itself (Sung et al., 2011). Using this method, significant and positive treatment gains were found in Sung and colleague's study for participants employed in either a social recreational program or a CBT intervention. These authors suggest that regular, structured sessions with consistent therapists and social exposure were all contributing factors to anxiety reduction in adolescents with ASD, rather than CBT itself.

Similar to Chalfant et al's. (2007) study, the adolescents in the current study were not formally assessed for ASD by the study therapists and therefore the validity of their diagnostic status could be queried. However, all participants did show documentation of their diagnosis and any potential participants were excluded from the study if this was absent. Furthermore, study participants fell within the average or above average autism behavioural level subscale on the SSIS-RS (90% falling within the above average range at pre-test). In addition, session therapists, including the primary researcher, were able to observe participant behaviour over the 5-month intervention period for both groups and verified that participants did present as meeting the criteria for an autism spectrum disorder.

Furthermore, group treatment will not suit all adolescents with ASD. As noted, one of the CBT participants found the group environment to be anxiety provoking and needed to withdraw from the intervention program. It may be that individuals with

highly complex psychiatric profiles may be better suited to individual treatment or multi-modal therapy where they begin with individual treatment and then engage in group treatment at a later stage. Research into successful group treatment engagement is needed.

Since there can be an overlap of symptoms between ASD characteristics and anxiety symptoms, the measures employed need to be considered in addition to the treatment outcomes (McConachie et al., 2014). Similar to previous studies the ADIS-P was deemed appropriate in differentiating between ASD behaviours and anxiety symptoms. There continues however to be uncertainty regarding how to best measure self-reports given that adolescents may lack insight and self-reflection (Hurtig et al., 2009; Mazefsky et al., 2011; McConachie et al., 2014). There is considerable work to be done in ascertaining which measures are appropriate and meaningful for this population.

In addition, knowledge of group assignment may have impacted responses. However, since the WL group stayed fairly constant in their anxiety levels from pre- to post- measures it does not appear that waiting for treatment attenuated anxiety levels (Chalfant et al., 2007). Conversely, the treatment group responses may have been impacted by their knowledge of receiving treatment which could have led to a reduction in symptomology reporting.

3.7.10 Future research. Future research could involve the investigation of the role that parents play in determining positive treatment outcomes for an older adolescent population. For example, Sung et al. (2011) showed positive treatment outcomes for adolescents with ASD without parent participation. Likewise, Ung, Selles, Small, and Storch (2014) found that parent involvement was not a moderator of treatment response, in their meta-analysis of CBT for youth with ASD. In addition, isolating the specific CBT components that lead to reduced anxiety and explicating the mediators and moderators of treatment response would prove highly beneficial for clinicians. This has been achieved in non-ASD youth anxiety studies (e.g., Kendall et al., 2016). Qualitative reports from parents in this study suggest both exposure and parent training were related to successful treatment outcome (see Study 2). Finally, as (Chalfant et al., 2007) declared following their study, it is questionable whether an ASD adaptation of the *Cool Kids* program is necessary in producing successful

treatment outcomes. It may be that the original *Cool Kids* program without adaptation (Lyneham et al., 2003) could have produced similar results.

3.8 Chapter Summary

This study is the first randomised controlled trial of the *Cool Kids* ASD Adaptation program targeting anxiety in older adolescents (aged 12-18 years) with ASD. Results demonstrated significant reductions in anxiety as indicated by diagnostic status, clinical severity scores, therapist ratings of overall clinical severity, parent and adolescent reports. In addition, decreases in parent-reported depression symptomology and increases in family quality of life were observed. Treatment gains were maintained at 6-month follow-up. Given that there were no significant pre-treatment differences, these findings provide support for the efficacy and social validity of a group, manualised, family-based cognitive-behavioural-therapy treatment for anxiety reduction in adolescents with high functioning ASD.

Results from this study are consistent with findings from previous RCTs that have mainly focused on younger children and early adolescents (e.g., Chalfant et al., 2007; Wood et al., 2009). This trial is the first known RCT to assess group CBT singularly targeting anxiety in adolescents, including older adolescents, with ASD. With social and emotional demands often increasing during adolescence, exacerbating the unique and often complex challenges inherent to ASD, elevated anxiety levels are common and the need for effective treatment paramount.

Chapter 4: The Social Validity of a Manualised Family-Based Anxiety-Reduction CBT program for Adolescents with High Functioning Autism Spectrum Disorder (Study Two)

4.1 Introduction

The purpose of Study Two was to assess the social validity of the *Chilled Program* for adolescents with high functioning ASD and clinical levels of anxiety. Wolf (1978) introduced the term "social validity" to the field of behavioural research to address concerns regarding consumers' adherence to and acceptance of behavioural programs. Within this framework, Wolf (1978) suggested there are at least three levels. First, do the specific behaviour goals of behaviour match what it is that society wants? Second, do the carers / participants / consumers find the procedures to be appropriate? Last, are the consumers satisfied with the results, including unexpected findings? In the past, concerns that this concept would lead to the de-objectification of scientific research have been raised (e.g., Barrett, 1987). However, the current study aligns with researchers who assert that social validity adds another dimension to evidence-based practice by not only highlighting issues regarding its applied value, but assessing whether the targeted population believe the intervention has been of assistance, and whether it has had a positive effect on their daily life (Kazdin, 2005; Ollendick, 2014b; Ooi, 2013).

Assessment can occur on a global level whereby consumers rate their satisfaction with the whole intervention, or it can occur on a component level, where they rate individual segments of the intervention on satisfaction (Foster & Mash, 1999; Ooi, 2013). To date, the subjective experience of adolescents with high functioning autism spectrum disorders has only been explored in a small number of CBT anxiety reduction studies (e.g., McConachie et al., 2014; Reaven, Blakely-Smith, Leuthe, et al., 2012; White et al., 2013). For example, White and colleagues (2013) examined the feasibility of a pilot CBT program targeting anxiety and social skills. These authors found that parents rated their satisfaction with the program slightly higher (mean score of 8.21 out of 10) than the adolescents did (mean score of 7.47). Similarly, Reaven and colleagues (2012) administered satisfaction questionnaires post-intervention to both parents and children with 72% finding the overall activities to be "very helpful". Neither of these studies reported use of qualitative feedback from participants. Fleishmann (2005) asserts qualitative research methodology to be effective in disclosing the personal perspectives of parents of children with ASD. In addition, a

phenomenological approach can capture the richness of experience of both parent and child (Marshall & Rossman, 2006; Miles & Huberman, 1994).

While there has been a surge in ASD intervention research over recent years, missing greatly from the literature has been the subjective experience or the voice of people with ASD (Charlton, 1998). In more recent years, individuals on the autism spectrum have adopted the phrase 'Nothing about us without us' (for example, the Autistic Self Advocacy Network http://www.asan-au.org/2013/08/nothing-about-us-without-us-a-research-agenda/) to reflect that their views are commonly misrepresented or misused by neurotypical (non-autistic) autism researchers, and the community at large, and that the voice of the autistic person needs to be heard in autism research. It has been suggested that a reluctance to involve the voices of young people with ASD could be due to the communication difficulties inherent with this condition (Beresford, Tozer, Rabiee, & Sloper, 2004; Lewis, 2009) and focusing on the deficits of ASD rather than recognising the strengths, abilities and personalities of these individuals (Allred, 2009; Baron-Cohen, 1989; Harrington, Foster, Rodger, & Ashburner, 2013).

The aim of this study is to explore the social validity of the *Chilled Program* (see Study 1 for more information on the intervention) by gathering both qualitative and quantitative data from the adolescent participants and their parents.

4.2 Method

4.2.1 Design. A mixed methods design was employed in order to assess the social validity of the *Chilled Program*. Here, both quantitative and qualitative data was collected and interpreted (Creswell & Plano Clark, 2011). This process involved the integration of participants' subjective experience of the intervention and their quantitative feedback regarding the intervention. In this manner, multiple sources of data enrich the results.

4.2.2 Participants. The participants consisted of 33 of the adolescents and 36 of the parents from Study One who completed at least 90% of the *Chilled Program*. Participants were from both the CBT intervention group and the Waitlist group. Since the adolescent sample was non-identifiable in this study, a breakdown of male / female participants and specific ages cannot be given. Adolescents were in the age range of 12-18 years. Parent participants consisted of 32 mothers (M = 44.78) and 4 fathers (M = 47.89). Most participants were Caucasian with five or fewer families being of Asian

or Pacific Islander descent. Given that adolescent details were absent from the questionnaire (in light of assuming they would feel more comfortable in providing honest feedback), the baseline characteristics of adolescents and parents are taken from Study One and are displayed in Table 1.

4.2.3 Measures. At the final group session, the *Program Satisfaction Questionnaire* measured the extent to which participants enjoyed activities and which activities they found most helpful. The adolescent questionnaire was adapted from the Student Evaluation Form by Gent et al. (2014) and Roberts et al. (2010). The author of the current study developed the *Program Satisfaction Questionnaire – Parent Version*. These questionnaires are not standardised measures and therefore lack psychometric properties.

4.2.3.1 The Program Satisfaction Questionnaire—Parent Version (Appendix I). This questionnaire requested information on parents' observation of their adolescent's behaviour over the course of the program. The primary researcher developed 12 items that were specifically designed to align with program content. It included three qualitative items: "Please describe any changes in your adolescent's skills or behaviour that you believe are directly due to their involvement in the *Chilled Program*", "Since the beginning of the program, what changes have occurred in how you support your adolescent (if any)?" and "We would particularly welcome any other comments you have about the program. Please write any other comments in the space below". In addition, nine quantitative items were examined using a Likert scale ranging from 1 (not at all) to 5 (very much). These included items related to parent's confidence in supporting their adolescent after the program, the extent to which they believed their adolescent enjoyed the program, satisfaction with program content, and noticeable changes in their adolescent since attending the program.

4.2.3.2 The Program Satisfaction Questionnaire—Adolescent Version (Appendix J). This questionnaire included 15 items on program satisfaction, seven items on usefulness of the skills taught, and five open-ended items on general feedback. Participants responded to quantitative items on a Likert scale ranging from 1 (not at all) to 5 (very much). Open-ended items examined the activities adolescents enjoyed and used the most, as well as how they might want to improve the program ("The activities I enjoyed the most were…," "The activities I did not enjoy were…,"

"The skills I use most from the program are…," "How would you make the program better?" and "Is there anything else you would like to say about the program?").

4.2.4 Procedure. Ethical approval was obtained from the Curtin University Human Research Ethics Committee, the Western Australia Department of Education, and the Catholic Education Office (WA) in 2011. This study was conducted as part of Study One therefore participants were recruited as outlined in Study One.

At the final *Chilled Program* treatment session, adolescents and parents were asked to rate their overall satisfaction with the program. This took approximately 10 minutes to complete. All ratings were completed in private without the primary therapist in the room. Some adolescents did require some assistance in comprehending the items on the measure and in these cases the co-therapists provided this. Parents provided their name and their adolescent's name on the parent questionnaire and adolescents were encouraged to remain anonymous in their response. Participants placed the completed sheets into one large envelope. For families who did not attend the final session, or if they expressed that they felt more comfortable completing the questionnaire at home, they were provided with a pre-paid envelope in order to easily return the completed form.

4.2.5 Statistical analysis. Descriptive statistics were employed to analyse the quantitative responses. Qualitative responses were transcribed, collated, and subjected to content analysis. In contrast to the objective statistical figures derived from quantitative analysis, qualitative methodology provides rich and meaningful information about an individual's experience or opinions (Patton, 2002). There exists a wide range of qualitative approaches underpinned by numerous theoretical frameworks with varying methods for analysing qualitative data. Given that there was no prior theory about participants' experience of this intervention, a deductive approach to data analysis was employed, allowing for an understanding of how the participants perceived the intervention (Ooi, 2013). Content analysis is an approach that groups similar words and themes together and allows for a true reflection of what was expressed by the participant without making inferences (Ooi, 2013; Wilkinson, 2008). This method involves "coding [of] participants' open-ended data into closed categories, which summarise and systematize the data" (Wilkinson, 2008, p.198). An

advantage of content analysis is that the product of analysis can be presented as quantitative data for comparison purposes.

In this study, utilising content analysis and safeguarding accuracy of interpretation, the researcher collated responses and these were crosschecked for interpretation by one of the researcher's supervisors, Associate Professor Clare Roberts. Responses to the questionnaire items were operationalised as words or phrases (Milward, 2007). Due to clarity and simplicity of the procedure, Berg's (2007) procedure for standard content analysis was employed. First, the written responses to the five open-ended questions were read. These were then typed according to the order of the items and notes were made along the margins. For example, responses (from all participants) to the first question were read and followed by the second question and so forth. The notes were then turned into codes and codes were grouped to form categorical labels or themes. Parent participants were de-identified in the analysis and the quotations were coded by a number that was designated to each participant questionnaire.

4.3 Results and Discussion

The results and discussion section is comprised of four parts, namely: (a) adolescent quantitative feedback which consists of the overall ratings of the intervention, (b) adolescent qualitative feedback which is comprised of responses to five open-ended questions, (c) parent quantitative feedback consisting of overall feedback about the program and any changes in their adolescent since completing the intervention, and (d) qualitative feedback from parents comprising of three responses to open-ended questions.

4.3.1 Adolescent quantitative feedback. A total of 33 adolescents completed the Program Satisfaction Questionnaire upon completion of the intervention. The overall program satisfaction including relevance / usefulness of the program content, and the extent in which the intervention was helpful to participants can be viewed in Table 20. Adolescents reported that the program was easy to understand (M = 4.00, SD = 1.03), and that the skills they learnt were useful. Overall, learning how to recognise anxious thoughts (M = 4.00, SD = 1.00), using helpful thoughts (M = 3.93, SD = 1.17), and learning to relax (M = 3.97, SD = 1.04), were rated most useful. The program additionally helped participants to understand their feelings (M = 3.82, SD = 1.18) and cope with stress (M = 3.82, SD = 1.18). Lower ratings were associated with

external components such as “I talked about the program to my friends,” (*M* = 2.06, *SD* = 1.30), and “My friends have commented on the changes in me as a result of the program,” (*M* = 1.79, *SD* = 1.34).

Table 20
Descriptive Statistics of the Program Intervention Evaluation for Adolescents derived from The Program Satisfaction Questionnaire—Adolescent Version

Item	Range	M	SD	Mode
I looked forward to the group each week	2-5	3.57	0.97	3
The information was easy to understand	2-5	4.00	1.03	5
The student guide was useful and easy to read	1-5	3.60	1.12	4
The program was useful in my everyday life	2-5	3.55	0.97	3
The program was helpful for getting along with friends	1-5	3.73	1.23	5
The program was useful for helping get along with family	1-5	3.33	1.31	4
The program helped me have confidence in myself	1-5	3.76	1.06	4
The program helped me to understand my feelings	1-5	3.82	1.04	4
The program helped me cope with stress	1-5	3.82	1.18	4
The program helped me to feel more positive about life	1-5	3.58	0.97	4
I talked about the program to my friends	1-5	2.06	1.30	1
My friends have commented on changes in me	1-5	1.79	1.34	1
I talked about the program with my family	1-5	3.30	1.33	3
My family have commented on changes in me	1-5	3.24	1.30	3
I would recommend the program to my friends	1-5	2.88	1.45	1
Learning about feelings was useful	1-5	3.76	1.20	5
Learning to relax and cope in difficult situations was useful	2-5	3.97	1.05	4
Learning how to recognise my anxious thoughts was useful	1-5	4.00	1.00	5
Learning how to use helpful thoughts was useful	1-5	3.94	1.17	5
Learning how to create stepladders was useful	1-5	3.42	1.20	3
Learning how to be assertive was useful	1-5	3.61	1.17	4
Learning how to improve my relationships was useful	1-5	3.70	1.18	4

Note. 1 = did not like/ find helpful at all to 5 = very much liked or found helpful.

4.3.2 Adolescent qualitative feedback. Content analysis of the adolescent’s responses to the five open-ended questions were categorised into four main themes,

namely: (a) friendship / normalising experience, (b) *Chilled* skills I use, (c) reduced anxiety, and (d) program improvement.

4.3.2.1 Friendship and a normalising experience. More than half of the adolescents reported that the *Chilled Program* provided them with an opportunity to interact with others who experience similar difficulties. It appeared that the program offered a normalising experience, a well-documented benefit of group therapeutic work generally (Rapee, 2000). The group setting may have been an opportunity to share in a safe space with others that have experienced common hardships.

> Personally I found one of the most helpful aspects of the program was getting to meet others like myself and seeing that I am not the only one who suffers from anxiety.

> Meeting and conversing with other people my own age that I could relate to well; gaining help and support from (helpful) people to assist in my outside life and private hardships at home and school.

Congruent with parent reports in Sofronoff's (2005) study, many adolescents commented on making friends during the program. During the group sessions adolescents frequently spoke of bullying experiences and the loneliness they feel in the school environment. With significant social difficulties, the opportunity to practice important social skills in a supportive environment is highly beneficial, particularly for older adolescents with ASD who are often wanting social relationships but lack the necessary skills to initiate and maintain them (Reaven et al., 2009).

> It was good meeting new people and socialising.

> I have made a new friend and that's all I need.

> I had a good laugh. I wish I had everyone's phone numbers so I could keep seeing them.

When asked what activities they enjoyed the most, eleven participants specifically mentioned the "break time" (approximately 30 minutes each session while the parent session was conducted) as one of, or their most enjoyable activities in the program. This may reflect the common difficulties that are reported in ASD research in regards to loneliness and bullying, including the challenges that this population commonly face in the school environment (e.g., Hammond & Hoffman, 2014; Koegel,

Kim, Koegel, & Schwartzman, 2013; Settipani et al., 2012). The group may have been an opportunity to share in a safe space with others that have experienced similar hardships.

> The activities I enjoyed the most were during the break time. We would usually play hangman but on the first week we played Jenga and Boggle.

> Playing with the boys outside running around.

Not all responses were positive in terms of interacting with group members:

> Putting up with other teens, especially H since he's really intense.

> (The) boys (were) restless in break.

4.3.2.2 Chilled skills I use. In response to the skills that adolescents use most from the program, "Deep/Cool breathing" was reported by 16 of the participants; "helpful thoughts" were reported by 15 of the participants; "relaxation tools" by 4 participants, and learning to control my feelings by 2. Some participants reported a combination of these and other skills.

> I do my cool breathing when I am at TAFE with TN my worst teacher.

> Identifying effectively when I am feeling worried and distress[ed] as well as skills I can use to comfort and eliminate these.

> Learning to control my feelings.

4.3.2.3 Reduced anxiety. Not surprisingly, given the nature of the *Chilled Program*, a number of participants reported the anxiety-reduction benefits that they have gained from the program.

> It improved my stress and anxiety levels.

> I was very sceptical about the program and I remember saying, "I wanted out" but over time I slowly adapted to being in the program and this proved to be very effective.

> The program helped me with my stress.

Three participants didn't find the techniques as helpful:

> I think the speech therapy did more for me than the Chilled Program.

> I have my own methods that work really well.
>
> Some of the topics I had already been through with a therapist so they were a bit boring.

4.3.2.4 Program improvement. In response to the items, "How would you make the program better?" and "Is there anything else you would like to say about the program?" a high level of positive feedback was provided (e.g., "it was fun", "it was good").

> It was fun and overall fantastic.
>
> I would recommend the content of this course to anybody dealing with anxiety – derived issues as I have found them very effective in their delivering, application, and results (short or long-term).

Some adolescents would have liked the program to be longer. This could derive from their enjoyment of the program or it could mean that they haven't benefitted enough from the program and needed more time to learn the techniques. Chalfant and colleagues (2007) emphasised the need to have a lengthened program for children with ASD compared to typically developing children. In order to reduce the program waiting time for the control condition this program was reduced in length by approximately 1 month in comparison to Chalfant's original study.

> I found the program extremely valuable and much enjoyed coming each week. Maybe the program could be longer? The long breaks over the holidays were a bit unfortunate. Maybe an AS support group or something similar would be really cool! Yay, Chilled!!! ☺
>
> Maybe more time? Otherwise I think it was pretty good.

The most disliked activity centred on the workbook and writing. Eleven participants commented on this. Many individuals with ASD have difficulty with handwriting, which may reflect these responses (Kushki, Chau, & Anagnostou, 2011). With this in mind, participants were consistently given the option of having one of the co-therapists scribe for them and this offer was taken up on a number of occasions. In addition, the worksheet style may remind students of school and as such may be viewed in a negative light. Notably, Attwood and Scarpa, (2013) recommend keeping handwriting to a minimum when using workbooks within CBT programs due to poor

handwriting skills often demonstrated by those with ASD. These authors suggest incorporating activities involving listening, watching and doing in favour of writing. An example of responses when asked about the activities they did not enjoy, included:

> The practical (like writing and reading).
>
> The written exercises in which I was required to express my own feelings and experiences of late
>
> The activity that I did not enjoy was all the writing. I find it easier to learn verbally

Nine participants responded that they would not make any changes to the program.

> I would not change the program…I loved every moment.
>
> … they were all useful in each and every day of my life… It couldn't be improved.
>
> I wouldn't; I believe that the program is effective in its missions and performs/ conveys its contents and aims in an easy and calming way.

Some individuals did offer ideas for program improvement:

> Talking more about emotions themselves. I don't really understand them so it's difficult to identify and deal with my own let alone others. It would be nice to go through and learn not to worry that your emotions are different to others and learn and be able to identify how they are different. It can be very hard and horribly disappointing when you don't feel what you are 'supposed' to feel.
>
> Make it more adolescent friendly from 12-18. It's brilliant for 9-14 years right now.
>
> Not talk about anxiety so much
>
> More relaxation.

Overall, adolescents commented favourably on the intervention and recalled the skills that they have learned during the program. A highlight was the interaction

that they gained with their fellow participants. They indicated that the intervention could be improved by having less writing and bookwork.

4.3.3 Parent quantitative feedback. Thirty-six parents completed the program satisfaction questionnaire upon completion of the *Chilled Program.* The overall program satisfaction including relevance / usefulness of the program content, and the extent in which the intervention impacted participants can be viewed in Table 21. Overall, parents were highly satisfied with the content covered in the program (M = 4.67, SD = 0.48), the facilitator (M = 4.72, SD = 0.51) and rated the overall program highly (M = 4.56, SD = 0.50). They observed positive changes in their child since participating in the program (M = 3.94, SD = 0.79), felt the program was effective in helping their child (M = 3.97, SD = 0.91) and reported feeling confident in their ability to support their child's social and emotional development after the program (M = 3.92, SD = 0.55). Lower ratings were attached to the items regarding how much their child talked with their parent about the program (M = 3.08, SD = 1.02) and negative changes that parents had observed in their children since commencing the program (M = 1.44, SD = 0.94).

Table 21
Descriptive Statistics of the Program Intervention Evaluation for Adolescents derived from The Program Satisfaction Questionnaire—Adolescent Version

Item	Range	M	SD	Mode
Please rate how confident you are in your ability to support your adolescent's future social and emotional development	3-5	3.92	0.55	4
To what extent did your child enjoy participating in the *Chilled Program*?	1-5	4.00	1.17	5
How satisfied were you with the content covered in the program?	4-5	4.67	0.48	5
To what extent has your adolescent talked with you about the program?	1-5	3.08	1.03	4
From your own observations, as well as comments you may have received from others, how effective do you feel the program was in helping your adolescent?	2-5	3.97	0.91	4
To what extent have you noticed positive changes in your adolescent since participating in the program?	1-5	3.94	0.79	4
To what extent have you noticed negative changes in your adolescent since participating in the program?	1-5	1.44	0.94	1
How satisfied were you with your parent group facilitator?	3-5	4.72	0.51	5
Overall, how would you rate the program?	4-5	4.56	0.50	5

Note. 1 = did not like/ find helpful at all to 5 = very much liked or found helpful.

4.3.4 Parent qualitative feedback. Parent's qualitative feedback was classified into four themes: (a) upskilling parents, (b) anxiety reduction, (c) exposure, and (d) positive family experience. A brief discussion of these follows.

4.3.4.1 Upskilling parents. When parents were asked what changes in how they support their adolescent, have occurred since the beginning of the program, twenty-one parents reported they are now able to guide or "coach" their adolescent in identifying their emotions and managing their anxiety. Since parents are provided with

psychoeducation on anxiety and taught skills introduced to adolescents over the course of the *Chilled Program* they reported having an understanding of when their child is anxious and of being equipped with strategies to assist their child. Certainly, research in this area has asserted that parent involvement may play an important role in successful treatment outcomes (Barmish & Kendall, 2005; Cobham et al., 1998; Reaven, 2009; Sofronoff et al., 2005). In addition, it is likely that many of these parents continually play a coaching or supporting role in their adolescent's life compared to parents with typically developing teens (Reaven, 2009). Therefore, when provided with the skills, they adapted well to the role of a *Chilled Program* coach. In order to protect the identification of the adolescents, different initials have been given in place of their names in the following quotes.

> I remind him of strategies and sometimes demonstrate how I need to use them myself to stay calm.

> We coach [D] and role-play possible situations to prepare her for things that might happen. We remind her of things that might happen. We remind her to use relaxation techniques and have helpful thoughts when worrying about a situation / event.

> I prompt [L] to use cool breathing and I help him to use helpful thoughts when he is anxious. I demonstrate mistakes are okay and model how I make mistakes too.

In addition, parents reported becoming more aware of their own emotions and how these may impact on their child. Parents were asked to practice the home CBT tasks themselves (e.g., helpful thoughts, relaxation strategies) in order to gain mastery of the strategies so that they could then guide their adolescent. This may have increased parents' awareness of their own anxiety levels.

> I continue to be mindful of how I support P when my own stressors get in the way.

> I try to help him to relax – sometimes I need to "Chill" myself.

> We are more calm in our approach to C and use relaxation techniques ourselves and cool breathing. We are trying to be consistent in our approach.

Forty-one responses across the three items indicated that parents have noticed a difference in their child's ability to identify their emotions, regulate their emotions, and an overall reduction in their child's anxiety. For example:

> H doesn't scream straight away when stressed.
>
> Has tried some new things, more strategies to cope with anxiety, more talkative about how she is feeling.
>
> A has started to be a lot calmer in his behaviour and seems to not to lose his temper as much. He uses his deep breathing exercises as well as muscle relaxation prior to bed and this is assisting in his sleeping.

Related to anxiety reduction, seventeen parents specifically reported the stepladder exposure exercise had been helpful in assisting their child to face and manage specific fears/phobias. Some parents commented generally, for example, "*the ladders are a great strategy to use"* and others more specifically reported the benefits of using structured exposure with their adolescent:

> Our first challenge was about cockroaches and [S] seems to be a lot calmer around them now.
>
> V has tried many new foods (and liked them) he has submitted to vaccinations. His whole attitude has 'changed' dramatically – for the better.
>
> O certainly has come out of his "shell" more. I have noticed he initiates conversations, approaches people to chat and can have a continuing conversation.

Overall, satisfaction and positive feedback regarding the *Chilled Program* was reported by sixteen parents.

> The (therapists) were fantastic in their approach. The program has helped my son understand anxiety and ways to deal with it when it is happening.
>
> I's confidence improved greatly through this program she has gained excellent skills to use in stressful situations and despite some setbacks from time to time, she's managing her anxiety so much better than she ever has! Thank you!

Training and involvement in treatment may assist parents in feeling more confident about helping their child (Sofronoff et al., 2005). Families in this study reported that they felt a sense of empowerment and efficacy in their ability to assist their child in managing anxiety. In addition, relationships in parent/child dyads were reportedly strengthened. Research has demonstrated that comorbid anxiety can place considerable stress on families who have a child or adolescent with ASD (Ooi et al., 2008). The finding that reducing anxiety in young people with ASD results in a reduction in parental stress may be supported in this study (Ooi et al., 2008). In addition, relationships between parent and child and overall family quality of life were reported to improve.

> X has enjoyed participating in the Chilled Program and he was looking forward to it each week. It has made us empowered to deal with his anxiety with tools that can be applied to any situation.

> The program has been absolutely wonderful for both B and myself. It has been a pleasure to have been part of it. I would recommend any child/parent that has anxiety issues to participate in such a program. It truly has made a difference. Thank you (facilitator).

> "Tools" have become the new "time-out."

Another positive impact of the *Chilled Program* was that some parents reported their adolescent's difficulties were normalised. As mentioned, group treatments often provide the opportunity for adolescents to share their experiences and normalise their feelings of isolation (Rapee, 2000). It has been documented that due to the difficulties in social interaction, the opportunity to practice important social skills can be beneficial, particularly for older adolescents with ASD who may desire social relationships but are not skilled in initiating and maintaining them (Reaven et al., 2009).

> It was very helpful for [L] to be able to recognise that she was anxious and to know that there are others just like her.

> D's realization that he is not the 'only one!' Others his age have similar worries and fears.

4.3.4.2 Parent support. Often for parents, having a child with ASD can contribute to feelings of isolation. Gaining support from other parents who have a shared lived experience of raising a child with ASD was gleaned from the comments:

> The size of the group was just right. Being able to talk to other parents was beneficial.

> Wonderful to meet other parents who also put in long hours and hard 'yards'

Whilst parents reported few negative aspects of the program, two parents commented on the difficulty in setting aside time for both the sessions and the home practice tasks between sessions.

> This program is great for the parents and the child, the only problem I found was the time factor in doing a bit everyday BUT in doing this through the stepladder the results were good. I am looking forward to school holidays to commit to doing some more goals. Thank you so much!

4.4 Chapter Summary

The purpose of this study was to explore the experience of adolescents and parents who participated in the *Chilled Program*. Overall, the results of the findings suggest that both adolescents and parents perceived the program favourably, evidenced by the following observations. First, the quantitative responses from the adolescent's global evaluation of the program demonstrated a positive attitude toward the program (mean satisfaction score of 3.47 out of 5), with parent's global responses rating slightly higher (mean satisfaction score of 3.81 out of 5). These results reflect the findings of White et al., (2013) and Reaven, Blakeley-Smith, Culhane-Shelburne, and Hepburn, (2012) whereby parents rated the program slightly higher than did adolescents.

Adolescents found the program easy to understand and actually rated this item highest. This could be interpreted in two ways. First, the program information is presented in a manner that aligns with the common complex cognitive profiles of this population. Alternatively, since the original program was aimed at 8-12 year olds, perhaps participants are reflecting that the program content was too "young" or "easy" for them and could be adapted for a higher developmental level. While some small adaptations were made to the original Cool Kids program (see Study One), the program content largely remained the same.

Parents rated their satisfaction with the facilitator, and then the program, above all other items. In this study the primary author delivered all of the treatment with the assistance of two co-therapists assigned to each group. Due to the numerous challenges in working with the unique and complex needs of this population, it may be that the author's clinical experience working with this population limits the generalisability of the study results. Rounsaville, Carroll, and Onken, (2006) recommend reducing therapist heterogeneity in order to maximise the power available in a small sample. To date, the clinical factors and parameters of flexibility required to successfully work with this client group have not been isolated (McNally et al., 2013).

The majority of adolescents and parents reported a reduction in adolescent anxiety symptomology, the main goal of treatment. For the adolescents, the accumulation of specific anxiety management skills was prominently reported, for example, 16 adolescents commented that "Cool Breathing" was a skill that they now used, and 15 adolescents reported using "Helpful Thoughts". Seventeen parents specifically commented on the benefits of their child using exposure techniques to assist with their anxiety. Whilst research supports the efficacy of exposure for anxiety reduction, the mechanism that brings about this change remains under-researched and has not yet been established (Hogendoorn et al., 2014). Future studies could employ a dismantling design for the purpose of isolating certain treatment components in order to examine the effect of individual components on anxiety reduction (Hogendoorn et al., 2014). Whilst head-to-head studies are still required to investigate the efficacy of individual versus group CBT treatment in this population, the qualitative feedback from the adolescents and parents emphasised the benefits gained through participating in group-based therapeutic work. The sessions appeared to provide a safe environment for adolescents to work on reducing their anxiety, with others who may be like-minded, or have experienced similar difficulties. Given that a high proportion of this population experience social difficulties, the group environment may in fact be a preferable treatment, providing an unmet social and normalising need. Evidence to this, in the general paediatric literature, a reduction in loneliness has also been found to mediate change in children diagnosed with social phobia (Alfano et al., 2009).

For parents, being provided with information and skills on understanding and managing anxiety was expressed as being helpful. In the *Chilled Program,* where the duration of sessions was over approximately four and a half months, parents may have felt supported and empowered, to assist their child in managing their anxiety.

Prominently, parents are often encouraged to participate in interventions when they have younger children with ASD, with little participation from parents in adolescent clinical treatment. In light of this, Reaven (2009) purports a dearth in documentation of the parent's evolving role in anxiety intervention for adolescents with anxiety. In the *Chilled Program*, parents remained at the clinic for each 2-hour session and when they were not participating in parent or family components (e.g., when the adolescent session was operating), they were provided with a space to have refreshments with each other. The discussions that took place among parents during this time, and within parent sessions, may have additionally provided support and/or a normalisation experience for parents. This supports findings of previous studies whereby parent involvement has positively contributed to treatment success (e.g., Chalfant et al., 2007; White et al., 2009).

Interestingly, a number of parents revealed that they had gained insight into recognising their own anxiety levels, and had begun to use the skills learnt in the program for themselves as well as their child. With the literature reporting high levels of parental stress, this finding supports that of Hudson and colleagues (2014) who reported that parent anxiety symptoms reduced following participation in the *Cool Kids* program. However, it may be that reductions in their child's anxiety may have led to changes in parent's anxiety levels (Hudson et al., 2014). It would have been useful for the present study to assess parent anxiety levels at pre-and-post intervention.

Both adolescents and parents reported satisfaction with the program, an acquisition of skills aligned with the program goals, and as outlined in Study One, they demonstrated high session attendance. This evidence of feasibility means that further refinement and development of *Cool Kids Child Anxiety Program: ASD Adaptation* (Lyneham et al., 2003) for adolescents is warranted.

4.4.1 Limitations and future research. There are several limitations in the current study. First, the sample size for the quantitative component was relatively small and participants were, for the most part, Caucasian. Second, adolescent participant demographics are not exact due to adolescent anonymity and missing data. For adolescent participants, this study has therefore used demographic data derived from Study One. Third, it could be problematic for other studies to directly compare results, given the use of non-standardised measures for assessing social validity. The questionnaires used however, were administered with ease and have been successfully used in other evaluation studies (e.g., Roberts et al., 2010). Fourth, with global questionnaires completed at post-treatment, participants were not asked to provide

weekly ratings of sessions, or any form of measurement across time. Such information may have been useful in identifying specific tasks or components within sessions that were deemed to be helpful or unhelpful. In addition, parents provided feedback without anonymity and this may have impacted their responses. For example, responses may be affected by a social desirability bias or demand characteristics. Given the high number of adolescent participants that provided negative feedback on the handwriting component, it may be useful for future studies to trial the use of electronic devices to record session work, or replace some of the written components with increased practical exercises, audio or visual material, or discussions within sessions. While attendance rates were high (see Study One), engagement during program sessions was not recorded for individual participants. This information could have been useful as it may have correlated with program session satisfaction (Schwartz & Baer, 1991).

Finally, and most importantly, although this study sought to hear the voices of young people with ASD and their parents, in order to determine how they feel in response to the program, they were not consulted in regards to the design, methodology, or on terms of reference used in this study. The need for participatory research in the field of autism is paramount. It is critical that individuals with ASD are able to bring their perspective and ideas to autism research to enhance the quality of the research process, as well as conveying an in-depth understanding to their experiences. In gaining the perspectives of individuals with ASD, future RCTs could focus on including youth with ASD and their families in the research design process through focus groups or online surveys. In addition, program satisfaction questionnaires could be administered electronically which would likely be more appealing to youth with ASD since they would not need to handwrite responses, and lengthier, more in-depth responses may be generated through typing. Whether typed/ electronic responses elicit more engagement and deeper responses compared to written feedback could be investigated in future studies for this population. Furthermore, the use of well-planned semi-structured interviews employing strategies similar to those shared by Harrington and colleagues (2013) are likely to gain greater qualitative information regarding the intervention than a written questionnaire.

In summary, the voices of young people with ASD are often omitted in autism research for a variety of reasons. Some researchers have trialled particular strategies and carefully planned their research methodology in order to capture an in-depth understanding of the experiences of these youth. To date however, the social validity

studies of anxiety interventions for youth with ASD are limited and for the most part, lack qualitative feedback. This study provides evidence for the acceptability and future development of the *Cool Kids Child Anxiety Program: ASD Adaptation* for adolescents (the *Chilled Program*). Future research examining the social validity of this intervention, and others similar to it, is warranted. Findings from such studies will enhance our understanding of how the client with ASD (and their family) perceives CBT treatment. Based upon the results of this study, the Chilled Program showed good acceptability and relevance to both parents and adolescents and appeared to meet the participant's needs for anxiety reduction. Perhaps most importantly, a number of parents and adolescents reported evidence of daily life enrichment as a result of participation. Recommendations for future intervention research take account of including youth with ASD, and their families, in the research process. In addition, developing and implementing creative strategies to enable adolescents with ASD to express their views and experiences of the intervention is of high importance. Through this process, despite certain social and communication challenges, the voices of individuals with ASD are more likely to be heard, which is imperative if they are expected to fully participate in research.

Chapter 5: General Discussion and Conclusions

5.1 Overview

Co-occurring anxiety disorders are common in youth with an autism spectrum disorder and are associated with increased aggressive and oppositional behaviours, limited social engagement, and the potential to adversely affect academic performance, employability, and relationships (Gadow et al., 2008; Howlin & Moss, 2012). With a surge of autism and anxiety research in recent years, this thesis began with a review of the literature on the history, prevalence, cognitive deficits and risk factors associated with autism spectrum disorders and co-occurring anxiety disorders. This was followed by an in-depth literature review on interventions for youth with ASD and clinical anxiety, with a particular focus on group cognitive behavioural therapy. Two linked studies were provided in the following chapters with the aim to increase the knowledge of cognitive behavioural therapy treatment for anxiety reduction in adolescents with ASD. The present chapter provides a summary of the major findings of each study, the integration of the two studies and how they uniquely contribute to the literature, along with the clinical and theoretical implications of these findings. Strengths and limitations of this research and directions for future research are outlined prior to the thesis conclusion.

5.2 Key Findings

5.2.1 Re-statement of the key findings of study one. The purpose of study one was to conduct a randomised controlled trial (RCT) to compare the efficacy of group CBT to a waitlist control. The major finding in this study was that the *Cool Kids Child Anxiety Program: ASD Adaptation*, a group, family-based anxiety reduction treatment, was effective in reducing anxiety symptomology in adolescents, including older adolescents, with ASD, with treatment gains maintained at 6-months follow-up. This finding suggests that adolescents (aged 12- to 18-years), with both ASD and clinical anxiety, can benefit from this intervention even though the original ASD protocol was aimed at children aged 8- to 12-years-of-age. This result is also congruent with previous research, including the Chalfant et al. (2007) investigation of the *Cool Kids Child Anxiety Program: ASD Adaptation* with children.

Secondary findings indicated that for adolescents, depression symptoms may become elevated with anxiety CBT treatment, however parent reports demonstrated a decrease in anxiety symptoms for both conditions. In addition, the findings of this

study suggest that the intervention has the potential to assist in increasing family quality of life. Furthermore, the gains made from pre- to post-treatment were maintained at 6-month follow-up. The findings of this study demonstrate that following 12-session group CBT adapted for children and adolescents with ASD, a significant reduction in participant symptoms and an increase in overall functioning can occur.

5.2.2 Re-statement of the key findings of study two. The purpose of study two was to investigate adolescent and parent satisfaction with the *Chilled Program.* Study findings indicated high levels of satisfaction with the *Chilled Program,* and congruent with previous research (Reaven, Blakeley-Smith, Culhane-Shelburne, & Hepburn, 2012; White et al., 2013), parents rated the program slightly higher than the adolescents. In particular, the findings of this study suggest that parents gained knowledge and skills in assisting their adolescent to manage their anxiety, as well as support and normalisation of feelings and experiences from participating in a group environment. Likewise, the group environment and the normalisation of difficulties was a major factor in program satisfaction for the adolescents. Findings from this study indicated a reduction in anxiety for the adolescents as well as an accumulation of skills in managing symptomology. In terms of program improvement, this study suggests that the writing component for adolescents could be changed with many adolescents reporting this to be an aspect that they did not like or enjoy. A couple of parents reported challenges in making time to complete the home practice tasks.

5.3 Integrating the two Studies: Theoretical Implications

The two linked studies in this thesis are complimentary to each other and together, provide a clearer picture of the overall research question and findings, while highlighting discrepancies and strengthening any links. For example, study two findings confirmed a reduction in adolescent anxiety following treatment, a major finding from study one. Findings from study two indicated that adolescents and parents not only gained skills in managing anxiety, but practised skills, such as deep breathing and helpful thoughts, outside of sessions. These findings are congruent with studies using CBT with non-ASD clinically anxious children where an increase in positive self-statements, a decrease in negative self-statements and an increase in coping strategies mediated treatment outcome (Hogendoorn et al., 2014; Kendall & Treadwell, 2007; Lau et al., 2010).

In addition, hierarchal exposure was a key element deriving from study two and may have been a contributing factor in both anxiety reduction and diagnostic remission observed in study one. Furthermore, the ASD program was extended over a longer timeframe (five months in the present study compared to three months in the standard program) which is likely to have provided more time to practice exposure tasks. Similar to the present study, a number of researchers have placed more emphasis on exposure components when adapting protocols for youth with ASD and achieved successful treatment outcomes (e.g., Chalfant et al., 2007; Wood et al., 2009). With behavioural exercises providing concrete feedback, therapeutic progress may have been facilitated (Scarpa & Lorenzi, 2013). Kendall (1997) and colleagues did find that reliance on cognitive strategies alone did not significantly reduce anxiety in a non-ASD population until a behavioural component was introduced. It is assumed this would be similar for an ASD client group however, anxiety reduction was achieved (parent reports only) without an exposure component in Sofronoff and colleagues' (2005) protocol with children. It would be useful for future studies to determine whether exposure is a mediating factor for anxiety reduction in adolescents with ASD.

Understanding how the cognitive deficits that commonly underpin ASD may contribute to anxiety disorders was not a particular focus of the current study. However, with rigid thinking and detail oriented processing believed to derive from having weak central coherence, it could be that cognitive restructuring may have assisted in reducing rigid thinking, expanding global processing, and therefore increasing optimistic and flexible thought, accumulating in reduced anxiety symptoms. In addition, parent involvement (as 'coach') and engaging in a manualised program may have assisted in enabling executive functioning skills (e.g., planning and organisation of exposure tasks and implementing anxiety management strategies) which could have assisted with anxiety reduction. Assessing whether participants with ADHD were less likely to demonstrate reduced anxiety following treatment could possibly assist with this theory. Further, being a group program, participants may have had the opportunity to develop theory of mind through learning to identify their own feelings, and those of others (e.g., through hearing fellow participants talk of their feelings and experiences, participating in group discussions, and learning how others may be impacted by their own behaviour). It would be helpful for future studies to assess these cognitive biases prior to and following anxiety treatment to understand how they may be contributing to, or moderating, the possible atypical, or distinct, symptoms of anxiety in those with ASD.

Consistent with Sofronoff et al's. (2005) findings that parent involvement enhanced treatment outcomes, study two showed that parents gained anxiety reduction skills while attending the program. In addition, parents reported that they often worked with their adolescent between sessions, on both anxiety management skills and exposure tasks. This is congruent with Puleo and Kendall's (2011) study findings where children in the family CBT condition completed more exposure tasks at home compared to the children in the individual CBT condition. In the current study, parent involvement may have contributed to the generalisation of adolescents' skills beyond the clinic, and to decreases in psychiatric symptomology and increases in family quality of life. It can be hypothesised that because parents felt empowered and more skilled to assist their adolescent, in addition to a reduction in anxiety for adolescents, improved quality of life for families was experienced.

A discrepancy between the two studies is apparent in terms of social skill development. In study two, many of the adolescents reported on the friendships they had made and on the enjoyment they had gained from being with similar aged peers, in both the sessions, and the session break times. It could be speculated that increased positive social interaction may have been associated with an increase in social skills however this was not found in study one. While the current study used the SSIS-RS, employing an alternative measure such as the Social Responsiveness Scale (Constantino, 2005) and an evidence based measure of core ASD deficits pre- to post-treatment/ intervention (e.g., the Autism Diagnostic Observation Schedule) may have provided more information on observed changes in core ASD symptoms (Danial & Wood, 2013).

5.4 Clinical Implications

With a lack of evidence for group treatments singularly targeting anxiety reduction in adolescents, the current study findings align with a small group of other RCTs indicating support for employing CBT to reduce anxiety in youth with ASD (e.g., Chalfant et al., 2007; Murphy et al., 2017; Reaven et al., 2012; Sofronoff et al., 2005; Sung et al., 2011; White et al., 2009, 2013; Wood, 2009). However, this study is innovative and adds information to the current literature area since there hasn't been an evidence base for the *Cool Kids ASD* protocol with older adolescents previously. Overall, while there were a few changes identified that could align this program more appropriately to adolescents, it was found to be a feasible intervention to modify and implement for adolescents with ASD and clinical anxiety.

With an increase in adolescents with ASD presenting to clinics for anxiety treatment, group programs can be cost-effective and they have the potential to reduce the demand placed on community services. In the present study three therapists delivered the group treatment, to a maximum of six adolescents and their parent/s. In Chalfant and colleagues (2007) study, two therapists experienced in ASD, presented the program, with similar treatment outcomes to the current study. It is unlikely that all clinical settings will have the capacity to facilitate programs with two or three therapists and therefore this group program may be limited to certain environments. However, there is a possibility that it could be delivered with fewer adolescents (for example, three or four) and one therapist. Given that it is a manualised program, mental health professionals are able to facilitate groups, provided they have completed the necessary training. The Emotional Health Centre at Macquarie University have recently made the *Cool Kids Child Anxiety Program: ASD Adaptation* manuals, along with Cool Kids Professional Education Training available to therapists both face-to-face and online. This accessibility narrows the gap between research and practice, an element that has been proposed by Ollendick (2014) whereby evidence-based practice serves as a strategy to positive treatment outcomes in the clinic or community setting.

While this group program demonstrated good outcomes, it is imperative that practitioners are aware that unique differences inherent in individuals with ASD may present certain challenges (Harkema & Coffee, 2014). For example, having children with behavioural problems, in addition to ASD and clinical levels of anxiety, within a group environment may necessitate particular modifications and a 'flexible delivery' approach (Chalfant et al., 2007; Mazzucchelli & Sanders, 2010). Selles and Storch (2013) suggest that similar to children with ASD who have challenging behaviour, incorporating applied behaviour analytic techniques into anxiety reduction programs may be useful.

Overall, the findings of this study provide an attempt to close the gap between research and practice. That is, the findings of this research will be available to practitioners, along with the experiences and feedback from the families who participated in the treatment program. Practitioners could close this gap further by providing information and their clinical experiences back to the researchers of this program regarding what has worked for them in clinical practice. Here, a consensus on what is efficacious in anxiety reduction for older youth with ASD can be determined (Ollendick, 2014a).

5.5 Strengths and Limitations of Study One and Two

While this research involved addressing a number of areas that have been missing in prior studies, there are several study limitations that need to be taken into consideration. The strengths and limitations of study one and two are discussed together.

5.5.1 Participants. A strength of this study was the likely representative sample of adolescents with ASD gained through a wider inclusion criterion, particularly in terms of age and comorbid diagnoses. Prior research has often excluded older youth with ASD, with some researchers additionally excluding participants who have presented with particular comorbid behavioural and or emotional disorders (e.g., ADHD, OCD, or ODD). In contrast, the intention for this study was to gain participants who were as closely representative of a community sample as is possible in a RCT. Considering that behavioural and emotional comorbid disorders commonly occur for youth with ASD, it made sense to include them for purposes of generalisability. As previously mentioned, a major limitation of this study is the small sample size and the fact that participants were primarily Caucasian, therefore results need to be interpreted with caution (Kraemer, 2006).

5.5.2 Therapists. Despite the risk of limiting generalisability of a treatment protocol, the primary advantage of having the same primary therapist across participant groups was that a consistent and standardised mode of program delivery was provided while controlling for therapist effects, such as personality, gender, and experience (Sung et al., 2011). While the independent clinical evaluators rated the therapists on a number of facilitation and therapeutic factors, it may have been useful to assess therapist behaviours more thoroughly in order to inform clinical practice for this client group. A recent review by Weston et al., (2016) emphasised the dearth of attention given to therapist competence within the ASD treatment literature despite factors such as integrity, therapist style, alliance and experience being linked to outcomes in numerous non-ASD intervention studies (Brown et al., 2013; Cooper, Loades, & Russell, 2018; Hudson et al., 2013; Wergeland et al., 2016). It could be useful to determine whether these therapist factors are the same for individuals with ASD. Ozsivadjian and Knott, (2011) assert that an in-depth understanding of autism spectrum disorders, particularly the neuropsychological processing style inherent in these individuals, is arguably the most useful tool that a therapist can bring to an intervention. In addition, a pilot study by Murphy et al. (2017) demonstrated that

clinicians were as successful in forming positive therapeutic relationships with clients with ASD as clinicians were with non-ASD participants in a previous study (McLeod & Weisz, 2005). This implies that individuals with ASD are able to form therapeutic alliances with therapists, an area that has previously been questioned. Future research could investigate whether an understanding of, in addition to experience working with individuals with ASD, are predictors of positive treatment outcomes.

5.5.3 Independent clinical evaluators. The use of blind independent clinical assessors was an additional strength of this study, however in reality this was difficult to put into practice. On three occasions, independent clinical evaluators reported that a parent had revealed whether they had received treatment or not, during the ADIS-P interview at post-treatment/ waitlist. Since the ADIS-P interviews were video or audio recorded, these three interviews were checked by the supervising clinical psychologist for reliability on clinical diagnoses and clinical severity ratings. Although parents were asked not to reveal their assigned condition during the interviews, they were not requested to sign a formal contract to this effect. Future researchers may want to implement ways to control for this potential error. Perhaps independent clinical evaluators can remind parents when they make the initial interview time, and then again at the commencement of the interview. Since Sung et al. (2011) used an active control group, parents were not actively informed of their study condition until the end of the research period. This is of course not possible with an intervention/waitlist control design but it does offer a solution to a potential problem.

An additional strength of this study was the blind independent clinical evaluators used to examine treatment integrity. Therapist's adherence to treatment gives testament to the fact that it was more than likely the treatment that led to successful study outcomes. Given that both intervention and waitlist group sessions were randomly viewed by the independent clinical evaluators, it can be suggested that no difference occurred in treatment delivery between participants being assessed for treatment change (CBT group) and those receiving treatment following the study assessment period (WL group).

5.5.4 Assessment and measures. A limitation of the current study is that the study therapists did not conduct the autism diagnostic assessments of the study participants. Instead, the researchers relied on retrospective ASD diagnostic data based on the previous diagnostic system (DSM-IV). The limited validated and normed measures to assess psychosocial symptoms in children, adolescents, and adults with

ASD is another study limitation (Gantman, Kapp, Orenski, & Laugeson, 2012). However, the majority of measures assessing treatment response in this RCT were chosen from a limited list of measures thought to be appropriate for adolescents with ASD and anxiety (White, et al., 2013). A strength of this study was the focus on acceptability of the treatment and the attempt to hear the voices of the participants. Standardised measures assessing program satisfaction in this client population are needed.

Limitations in child and adolescent self-reports complicate psychiatric diagnostic or symptomology information (Mazefsky et al., 2011), and this may be the case in the current study. Similar to previous research in this area (e.g., Reaven et al., 2009; Wood et al., 2009), it could be that accurate self-reporting was diminished by ASD deficits such as, communication difficulties and challenges with introspection and emotion identification. Furthermore, while two self-report measures were employed in the current study, the majority of information gathered through the measures relied on parent-reports. Since parents were not blind to condition, those in the CBT condition may have been invested in achieving successful outcomes due to the time they dedicated to the program (e.g., attending sessions, and assisting their child in homework and exposure tasks). In addition, parents may have felt hope that positive results would occur for their adolescent, as well an expectancy for change (McNally et al., 2013). As McNally and colleagues suggest, even if parents perceive change to occur then this may positively impact family quality of life. Future studies may take these factors into consideration when designing research. For example, the use of a credibility and expectancy questionnaire completed by participants in both conditions, prior to the treatment/ waitlist, may ascertain if differences in expectancy exist.

5.5.5 Treatment. A further strength of the current study is the minor adaptation of the *Cool Kids Child Anxiety Program: ASD Adaptation*, to assist in its appeal and suitability for adolescents, including older adolescents with ASD. Given the qualitative feedback from study two, it is possible that further adaptation could be beneficial for the older adolescents. A focus group following group treatment may have been effective to advance understanding of the adolescents' experience of the program components and to glean ideas as to how specific components could be changed to suit an older audience.

To date, there is no single established best approach for group treatment for youth with ASD and co-occurring anxiety disorders. For children and early

adolescents there have however been numerous modification trends to traditional CBT, although it is still not known which treatment components are imperative for anxiety reduction (Selles & Storch, 2013). It may be that not every treatment component is needed for change to occur (Moree & Davis, 2010). In the current study it could be suggested that visual tactics, parent involvement, and exposure, assisted in psychological change however, there is no certainty of this claim. In addition, adolescents with particular types of anxiety may respond better to certain treatments. For example, a strength of the current study is the finding that adolescents with a primary anxiety diagnosis of GAD and specific phobia responded better to the treatment program compared to adolescents with other primary anxiety disorders.

5.5.6 Study design. While a small number of prior studies incorporating older adolescents with ASD, targeting anxiety reduction, have used group CBT in open trial (e.g., Ehrenreich-May et al., 2014) or have additionally targeted social skills (e.g., White, 2013), a strength of the current study design is that it was a family-based randomised controlled trial, using a treatment and a waitlist group. In recent years there have been a growing number of RCTs using an active control group. The difficulty with this however, has been that active control groups often contain some element of CBT, therefore interfering with a pure comparison being made between treatment and control groups (Ewing, Monsen, Thompson, Cartright-Hatton, & Field, 2013). Sung and colleagues (2011) appeared to control for this factor well, offering their control group a social recreation program which included age-appropriate activities such as puzzles, preparing a meal, and magic tricks. Given that these authors did not include parents, or use the ADIS-P to assess anxiety, future group CBT studies replicating the use of an active control group and including these missing elements are warranted. Additionally, a control waitlist group in conjunction with a treatment and active control conditions will assess whether the therapist and/or group contact may be contributing to anxiety reduction. A further weakness of the current study design was the lack of control group at follow-up due to it being deemed unethical to withhold the evidence based treatment (CBT) for longer than the 6-month follow-up period.

Therapists facilitating the groups sessions were not blinded to treatment conditions which may have impacted the results. There is the possibility that therapists may have interacted differently with treatment group participants, or that different groups may have received different intervention components. However, the blinded independent clinical evaluators ratings did not demonstrate any significant differences in adherence to treatment, or in therapist facilitation, across the randomised sample of

group sessions that they rated so this appears unlikely. Further limitations were that homework compliance was not calculated for participants in this study, nor was individual in-session participation evaluated. In study two, program satisfaction feedback was only collected at the end of treatment rather than following each session. This limited the ability to identify individual session treatment components that may have contributed towards positive or negative intervention outcomes.

An additional strength of the current study was the 6-month follow-up period, demonstrating short-term maintenance of treatment gains. However, this follow-up period pales in comparison to studies of typically developing children where maintenance has been studied for up to 14 years following CBT treatment. Differences between the treatment and control groups in the current study could have been better determined with a longer follow-up period.

5.5.7 Analysis. Many previous studies have employed conventional analysis of variance which is limited by a number of statistical assumptions. A unique strength of this study is the use of the GLMM statistical procedure to analyse the data. This sophisticated statistical tool was able to account for the missing data and reduce error in the data, thereby increasing the accuracy of the findings (Tabachnick & Fidell, 2013). Analyses of statistical significant change were supplemented by the Clinical Global Impression Scale and Reliable and Clinically Significant Change in order to determine whether change transpired to the individual level, a necessity when assessing the efficacy of an intervention (Chambless & Hollon, 1998; Jacobson & Truax, 1991). Given that multiple statistical comparisons were conducted on a fairly small number of participants, caution needs to be taken when interpreting the results.

5.6 Recommendations for Future Research

In light of the initial findings suggesting positive treatment outcomes and numerous study limitations, the following future research directions are suggested to replicate and expand on the present studies.

5.6.1 Study one: Future research recommendations. In the typically developing paediatric population there is a consensus that group and individual treatment are fairly equivalent in terms of treatment outcomes (Reaven et al., 2012). To date, such comparisons of CBT have not been made in the ASD population. Future research needs to investigate whether there are differences in treatment outcomes between individual and group CBT in a head-to-head randomised controlled trial. In

addition, identifying whether youth with highly complex psychiatric profiles may be more suited to individual therapy. More recently, internet therapy has been studied (Weston et al., 2016) and this may be an attractive and more accessible option for some individuals with ASD. In addition, most study samples in this area have been fairly small and as such multi-site research studies assessing individual, group, and internet cognitive behavioural therapy are needed (Ho et al., 2018).

Furthermore, identifying which cognitive and behavioural treatment components are necessary to reduce anxiety will assist in protocol design and may be more cost effective and less time consuming then including all program components. Danial and Wood (2013) suggest that researchers measure cognitive skills as well as behavioural change across assessment points in order to ascertain whether cognitive and behavioural change occurs simultaneously for people with ASD, as expected with CBT. Such measurement may assist in identifying which CBT components are responsible for producing changes in anxiety for this population. Further, identifying how specific ASD symptoms affect response to treatment has been stated as a top priority by researchers (Vasa, Keefer, Reaven, South, & White, 2018). Additionally, isolating the specific CBT components that lead to reduced anxiety, and explicating the mediators and moderators of treatment response would be beneficial for program developers and therapists (Vasa et al., 2014).

Furthermore, the need for parent involvement in CBT programs for adolescents with ASD is still questioned and future studies could simultaneously study the use of CBT with and without parent participation. Broadening the *Cool Kids Child Anxiety Program: ASD Adaptation* to suit individuals with ASD and intellectual disability is additionally worth studying. Likewise, adapting the program for young adults (e.g., 18- to 25-year-olds) may also be beneficial given the proposed high rates of mental health problems and poor adult outcomes reported in the literature (Howlin, 2000). With researchers focusing heavily on children and early adolescents, this age group has been neglected in intervention studies.

The original study using the *Cool Kids Child Anxiety Program: ASD Adaptation* (Chalfant et al., 2007) lengthened the standard Cool Kids program so that the 12 sessions were delivered to children with ASD over a six month period. The current research ran the program over five months with similar results. Determining whether a longer length of program is necessary, and whether this is related to maintenance would be valuable (Vasa et al., 2014). In addition, with feasibility and efficacy established in accordance with the NIMH guidelines, it would be beneficial

to extend research on the current program to a phase 4 community-effectiveness trial. Having the protocol administered by a community agency would enable validation of the results within real world conditions (Lopata et al., 2010; Smith, Yule, Perrin, Tranah, Dalgleish, Clark, 2007).

As mentioned, considerable work is required in the area of screening and assessment of psychiatric difficulties in addition to ASD. Currently, with a heavy reliance on measures designed for the typically developing youth, it is challenging to incorporate outcome measures in clinical trials for individuals with ASD. In addition, while some functional measures were included in this study design (e.g., social skills and family quality of life), other improvements in symptoms could also be measured, such as school attendance, extra-curricular activities, improved social relationships, and adaptive behaviours, in order to determine if anxiety reduction is related to functional outcomes (Reaven, Blakely-Smith, Culhane-Shelburne, et al., 2012). Furthermore, with multi-informants recommended, it could be useful for future studies to include teacher-reports. This may assist in further identifying whether anxiety reduction is being generalised into the school environment.

5.6.2 Study two: Future research recommendations. It is recommended that weekly participant feedback on treatment acceptability and monitoring of outcomes are included in future studies, perhaps incorporating single case experimental design. Ideally, this would assist in identifying specific components that may be impacting on change within sessions and could assist in future program development. Adolescents and their parents could additionally be measured on specific skills for example, anxiety knowledge and coping strategies in order to determine what information and skills they have mastered over time to achieve intervention effects (Ho, Stephenson, & Carter, 2014). Finally, for true social validity it is recommended that people with ASD be involved in the design and development of future research studies (Foster & Mash, Eric, 1999). For example, in the current study, participants could have been included in the adaptation of the manual and could have provided feedback on individual components of the program. Inclusive design approaches allow for the authentic involvement of individuals with ASD from the beginning of research projects (Parsons & Cobb, 2014). This allows for research practices to be facilitative, inclusive and

effective in supporting social inclusion and communication (Abascal & Nicolle, 2005; Parsons & Cobb, 2014).

5.7 Conclusion

This is the first RCT adolescent adaptation of the *Cool Kids Child Anxiety Program: ASD Adaptation* (Chalfant, Lyneham, Rapee, & Carroll, 2011). The findings of the present research provides valuable information on the efficacy and social validity of this program with older adolescents. A number of treatment effects were found, including the primary outcome of anxiety reduction, as well as increases in family quality of life. Treatment acceptability of this intervention by the participants and parents was also found. Due to these findings and those of Chalfant et al., (2007), it is recommended that the current program can be employed to assist this client population.

In more recent years there has been a substantial growth in the study of ASD and anxiety. A number of books have been published on this topic alone (e.g., Kerns, Renno, Storch, Kendall, & Wood, 2017; Scarpa, White & Attwood, 2013) in addition to numerous research studies (e.g., Chalfant et al., 2007; Reaven, 2011; White et al., 2009; Wood & Gadow, 2010) systematic reviews and meta-analyses (e.g., Ho et al., 2014, 2018; Ung et al., 2014). Providing children and adolescents with ways to cope with and manage anxiety is likely to assist with better mental health and functional outcomes across the lifespan. While the dominant focus has been on assisting children with ASD, more recently researchers have begun to investigate ways to understand how adolescents and young adults are affected by both ASD and affective disorders. Developing clinical applications to achieve successful treatment outcomes with this population is imperative, due to their obvious complex psychiatric needs and poor outcomes.

The importance of placing the views of the adolescents and their families at the centre of this work has been the guiding principle of this research. While this study does not claim to achieve “best practice” in this area, it hopes to offer a basis for how researchers can continually develop, reflect, and advance components of social validity in intervention research (Parsons & Cobb, 2014). Autism families are prone to experiencing high levels of stress, and this may be reduced with interventions that are both effective and appropriate to participant and family needs. Including the voices of people with ASD in research can assist in participant-centred research design,

implementation, and evaluation, and is likely to provide benefits and rewards for all involved (Parsons & Cobb, 2014).

While the information provided by the present study will contribute to the existent body of work in this area, there is much work needed in order to ascertain best practice for adolescents with diagnoses of ASD and clinical anxiety. There are a variety of treatment approaches and methodological shortcomings in the current literature, and often very idiosyncratic and complex profiles amongst participants. Through research and practice, the overall goal is to provide the best treatment to individuals with ASD, and their families, in order to improve their psychological well-being, daily functioning, and quality of life. In striving to understand the relationship between ASD, anxiety, and treatment, the continual advancement of knowledge gained through research and practice can be drawn upon to assist adolescents with ASD to fully realise their life potential.

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Appendices

Appendix A: Cover Letter and Flyer

The Chilled Program

Dear Parent,

As recently discussed, I have attached the information letters, a demographic form, and consent forms for both yourself and your child. The information letters describe the program in more detail and if either you or your child would prefer this information given to you verbally then please contact me. I am happy to visit you to discuss the program in more detail. Likewise, if there is any aspect of these letters that you would like to discuss, or questions regarding the program generally, please do not hesitate to contact me. Please note that I have a new phone number to be contacted on: **(08) 9266 3436** or I can be contacted by email: Theresa.kidd@postgrad.curtin.edu.au

Please ensure that you and your child read the appropriate information letters and if you both agree to the information provided, and would like to participate, then please complete and return the following forms in the reply paid envelopes enclosed:

1) Chilled Demographic Form
2) Consent Form - Parent
3) Consent Form for Audio and Video Recording
4) Chilled Consent Form – Adolescents

Once again, if you have any questions please contact me on (08) 9266 3436.

Thank you for your time and interest in The *Chilled* Program

Kind regards

Theresa Kidd
PhD Candidate (Clinical Psychology)
Curtin University
School of Psychology and Speech Pathology
GPO Box U1987 Perth,
Western Australia 6845
Phone: 08 9266 3436
Email: theresa.kidd@postgrad.curtin.edu.au

Appendix A: Continued

The Chilled Program

Who? 12 - 18 year olds who have high functioning Autism Spectrum Disorder (ASD) or Asperger's Syndrome and experience anxiety.

What is it? Chilled is a 12-session group program to help adolescents to learn how to reduce and manage their anxiety.

How does it work? Chilled uses Cognitive Behavioural Therapy (CBT) techniques for the treatment of adolescent anxiety and is specifically tailored to meet the needs of individuals with high functioning ASD.

This program includes:

- Relaxation training
- Identification of emotions and thoughts
- Positive self-talk
- Coping skills
- Social skills
- Problem solving
- Parent sessions

Contact: **Theresa Kidd**

School of Psychology and Speech Pathology, Curtin University

Theresa.kidd@postgrad.curtin.edu.au

Phone: 0420482053

Which group? Chilled is part of a research project at Curtin University which means, if eligible, you will be randomly placed into one of two groups:

- The CBT group – you will begin group sessions in May, 2013 or
- The Waiting List Group – you will wait 6 months before attending sessions.

Adolescents and parents in both groups will be required to complete questionnaires throughout the study.

Cost: Free!

Appendix B: Information Letter for Parents

Introduction

The *Chilled Program* is based on the Cool Kids® Anxiety Program and has been specifically adapted for adolescents with an Autism Spectrum Disorder. *Chilled* is a weekly course designed to teach adolescents how to better manage their anxiety. It is a group program involving the participation of one parent and their adolescent, and runs for 12 sessions. The first 9 sessions are run once a week and the final 3 sessions are once a month. Participating in this research program allows families access to cutting edge treatment for anxiety.

The sessions teach clear and practical skills based on cognitive behavioural therapy (CBT). Sessions have been adapted to suit the visual learning style of individuals with ASD. Positive reinforcements will be used to make the sessions motivating and enjoyable.

Topics covered in the program include:

- Learning about feelings
- Me and my anxiety
- Learning to Relax
- Detective thinking, and helpful thoughts
- Becoming the boss of my fears and worries
- Dealing with worry
- Social skills and assertiveness

One parent of the adolescent will attend a concurrent session, which will cover educational and informational material relating to helping their adolescent manage their anxiety.

<u>Participation is Voluntary</u>

Participation is the study is entirely voluntary and you are free to withdraw from the study at any time without prejudice. You do not need to give a reason for not completing the study. If you decide not to participate, or want to leave the study at a later stage, and would like your adolescent to receive help from outside of the study, then we will be happy to provide you with a list of professionals experienced in ASD.

What is the Purpose of the Study?

This study will be comparing anxiety levels of adolescents before and after group participation, and 6 months following the completion of the sessions. In addition, this research will compare anxiety levels between those that attend the sessions during the study and those that are in the waiting list group. If you are accepted into the study, you will be placed into one of two groups:

1) The Intervention group.
   In this group adolescents will attend 12 group sessions to help them learn to recognize and manage their anxiety levels. One parent of each adolescent will attend concurrent parent information sessions.
2) The Waiting List group.
   Participants in this group will wait approximately 6 months before participating in the treatment sessions however they will be required to complete questionnaires three times throughout the study.

What is involved if I decide to participate?

1) If your adolescent is aged between 12 and 18 years, has a diagnosis of High Functioning Autism or Asperger's Disorder, and suffers from anxiety, then they may be eligible to participate in this study.
2) Contact Theresa Kidd, the chief investigator of this study, on 9266 4149 to discuss eligibility and the study further.
3) Theresa can then make a time to meet with you (at a place and time convenient to your family) to discuss the study in more detail and provide you and your adolescent with consent forms. If this is not convenient the forms can be posted to you and returned to the university in the reply paid envelope provided should you and your adolescent wish to participate.
4) Once the consent forms are signed, a clinical interview with the parent to assess their adolescent's anxiety levels will be conducted. Since this study is looking at reducing anxiety levels, adolescents will need to meet an anxiety disorder diagnosis to participate in the study.
5) Study eligibility will then be determined and if eligible, you will be randomly placed into one of two groups: Intervention group or Waitlist group.
6) You and your adolescent will need to be available to attend 12 sessions. The first 10 sessions will be held weekly and the final 2 sessions monthly thereafter. Sessions will run for approximately 2 hours on a weekday afternoon, with the possibility of a Saturday morning sessions. You will be asked to specify the days/times suited to you, however it is possible that you may not receive your preference. If you cannot attend this first group you may be offered a second group the following term.
7) Parent and adolescent dyads will be required to complete a homework task in between sessions.

8) Questionnaires packages will be posted to parents and adolescents in both groups, 3 times throughout the study, and returned using the provided reply paid envelopes. Assistance in completing these can be given if required. The first questionnaire package will be completed prior to the commencement of the study, once the sessions have been completed and then 6 months later for the intervention group only.
9) In addition to the clinical interview conducted with parents prior to the commencement of the study, adolescents' anxiety levels will additionally be assessed upon completion of the sessions and 6 months after the sessions have been completed.

Potential risks

This program has been used in a study with younger adolescents, with very promising results. However, no guarantee can be given that your adolescent will benefit from treatment. You are able to withdraw from this study at any time.

Medication and Therapy

Whilst participating in the study we ask you to refrain from participating in any other psychological therapy programs, social skills training or parenting programs. If the adolescent is on medication prior to commencing the study they will need to remain on the same dosage throughout the study. If an adolescent is not taking medication (e.g., for anxiety) prior to commencing the study then it is preferable that they remain medication free for the entirety of the study (including 6 months after sessions are completed). Adherence to these conditions will ensure accurate outcomes.

Confidentiality

All personal information collected throughout the study will be kept confidential and remain in a locked filing cupboard at Curtin University for 5 years following the study. A code will be given to each participant to ensure that the names of participants are not documented with interview material or completed questionnaires. Information will only be viewed by those connected with the study and if the research is published, name of participants will not be used.

Upon completion of the study, general results will be made available to participants upon request.

What do I do now?

If you are interested in participating in the *Chilled* Adolescent Anxiety program: ASD Adaptation, please complete the consent form attached, or if you require more information, please call myself, Theresa Kidd, directly on (08) 92664149 or email me Theresa.kidd@postgrad.curtin.edu.au or my supervisor, Dr Clare Roberts (08) 9266 7992 or email Clare at C.Roberts@curtin.edu.au

Appendix C: Demographic Form

Parent Name:
_____

Age:
_____

Address:
_____

Relationship Status:
_____

Number of Children:
_____

Name of Adolescent with ASD:
_____

Age of Adolescent:
_____
_____

Age at time of diagnosis:
_____

Diagnosis/Diagnoses:
_____

History of Intervention and therapy services child has received:
_____

Is your adolescent currently receiving any intervention/therapy?
_____

Is your adolescent currently on medication? If so, what medication?
_____

Is English your adolescent's first language?
_____

Does your adolescent have any allergies or diet restrictions?
_____

Is there any other information about your adolescent that may be useful for the researchers of the study to know?
_____

Appendix D: Consent Form – Parent

Please read the following statements, and sign below if you agree for your adolescent to participate:

- I understand that the treatment is aimed to reduce anxiety levels however there is a chance my child will not benefit from treatment.
- I understand that my adolescent will be assigned to either the Intervention group or the Waiting List group and therefore may need to wait 6 months before receiving treatment.
- I understand that I will need to attend concurrent sessions (12 in total) to my adolescent and that we will need to complete a weekly homework task.
- I acknowledge that my adolescent will not participate in other psychological therapy or social skills program for the duration of the study and for 6 months following the final session.
- I acknowledge that if my adolescent is on anxiety medication prior to commencing the study, this needs to remain at the same dosage throughout the study and for 6 months following the final session.
- If my adolescent is not taking medication I understand that they are not to commence medication during the course of the study and for 6 months following the final session.
- I understand that I am not obliged to participate in this study and I am free to withdraw at any time without prejudice.
- I can refuse to answer any question without reason.
- I understand that information gathered will be treated with confidentiality and that the research data gathered for the study may be published provided I am not identifiable.
- I understand that information relating to the study will remain in locked storage at Curtin University for 5 years following the completion of the study.
- I have read and understood the information sheet.
- I have been given the opportunity to ask any questions about the study and these have been answered to my satisfaction.

Parent's name: _____

Parent's name: _____

Adolescent's name: _____

Parent's signature: _____

Date: _____

Contact telephone number: _____

Appendix E: Consent for Video Recording

Consent form for video recording for supervision and research purposes

Place of video recording: _____

Participant's name: _____

For research and supervision purposes there is a possibility that some sessions will be recorded. The video may be used for supervision purposes to ensure that the facilitators are meeting the requirements of the program, and for educational and teaching purposes.

The video will record group sessions and will be stored in a locked cabinet at Curtin University when not in use. You do not have to give consent to your adolescent or yourself being video recorded, your choice in this matter will not affect your participation in the program. You are able to withdraw your consent to be video recorded at any time.

If you consent to your consultation being recorded, please sign below.

To be completed by the parent if the adolescent is under 18 years of age.

I have read and understood the above information and give permission for my adolescent and myself to be video recorded in sessions.

Name of adolescent:

_____

Name of Parent:

_____

Signature of Parent:

_____

Date: _____

Appendix F: Adolescent Information Letter

Chilled Information Letter – Adolescent

The Chilled Program is a fun way to learn how to relax and calm your fears and worries in a safe, small group setting.

What do I have to do?

- If you wish to participate please sign the consent form and return it in the reply paid envelope.

- Complete a short questionnaire 3 times throughout the study. We can help you with this.

- Attend 12 group sessions which will include topics such as:

  - What is anxiety?
  - Me and my anxiety
  - Learning about feelings
  - Relaxation
  - Detective thinking, and learning to think more realistically
  - Becoming the boss of fears and worries
  - Learning to solve a problem
  - Social skills and assertiveness

- Complete an activity each week between sessions with the help of your parent.

- Be in the draw to win movie vouchers, random prizes during sessions, and eat the snacks provided!

- If you have any questions about participation please ask your parent or call Theresa Kidd at Curtin University on (08) 9266 4149.

Appendix G: Adolescent Consent Form

Chilled Consent form – Adolescents

- I understand that I am not obliged to participate in this study and I am free to withdraw at any time without prejudice.
- I understand that if I participate in this study that I will need to attend 12 sessions and complete an activity each week between sessions, with the help of my parent.
- I can refuse to answer any question without reason.
- I understand that information gathered will be treated with confidentiality and that the research data gathered for the study may be published provided I am not identifiable.
- I understand that information relating to the study will remain in locked storage at Curtin University for 5 years following the completion of the study.
- I have read and understood the information sheet.
- I have been given the opportunity to ask any questions about the study and these have been answered to my satisfaction.

Adolescent's name: _____

Adolescent's signature: _____

Date: _____

Contact telephone number: _____

Appendix H: Checklist Examples

Chilled Facilitator Checklist

Session Checklist: Facilitator/s:

Session 1: Program overview / Feelings and worries

Activity	Tick box if covered	Time spent (minutes)	Notes
Introduction	☐		
Family together	☐		
Adolescent's alone:			
Feelings Identification	☐		
"What is anxiety?	☐		
Introducing Calvin and Austin	☐		
Austin's list of worries	☐		
Healthy vs. unhealthy worries	☐		
Anxiety and my body	☐		
Practice Task 1: My body and my worries	☐		
Practice Task 2: Using my Cool Teens coping skills	☐		

Session 1: Program overview / Feelings and worries

Please rate the following aspects of the lesson:

1. The **overall success** of the lesson:

---

1 2 3 4 5 6 7 8 9 10
Comments:

2. Your **preparation** – knowledge of materials, organisation of resources, etc..

---

1 2 3 4 5 6 7 8 9 10
Comments:

3. Your **presentation** – clarity, pacing, thoroughness, etc..

---

1 2 3 4 5 6 7 8 9 10
Comments:

4. Your **rapport** with the class – friendliness, use of names, etc…

---

1 2 3 4 5 6 7 8 9 10
Comments:

5. The **group cohesion** and **support:**

---

1 2 3 4 5 6 7 8 9 10

Appendix H: Checklist Example 2

Session Checklist: Facilitator/s:

Session 5: Becoming the Boss of My Fears and Worries

Activity	Tick box if covered	Time spent (minutes)	Notes
Family together	☐		
Adolescent's alone:			
Overview of group rules/ home tasks			
Bossing Back!	☐		
How Have My Worries Been Bossing Me About?	☐		
Family Together			
Rewards for Being Brave			
What are the Fears or Worries that I want to Boss Back?			
Practice Task 5a:Making a Fears and Worries List	☐		
Practice Task 5b: Using My Chilled Skills	☐		

Parent Session:

Covered Material

Comments

Session 5: Becoming the Boss of My Fears and Worries

Please rate the following aspects of the lesson:

1. The **overall success** of the lesson:

---

1 2 3 4 5 6 7 8 9 10

Comments:

2. Your **preparation** – knowledge of materials, organisation of resources, etc..

---

1 2 3 4 5 6 7 8 9 10

Comments:

3. Your **presentation** – clarity, pacing, thoroughness, etc..

---

1 2 3 4 5 6 7 8 9 10

Comments:

4. Your **rapport** with the class – friendliness, use of names, etc…

---

1 2 3 4 5 6 7 8 9 10

Comments:

5. The **group cohesion** and **support:**

---

1 2 3 4 5 6 7 8 9 10

Comments:

Appendix I: Parent Questionnaire

Program Satisfaction Questionnaire
Parent Version

This form assesses how effective and appropriate you found the *Chilled* program. Thank you for taking the time to complete this form - your feedback is important.

Please describe any changes in your adolescent's skills or behaviour that you believe are directly due to their involvement in the *Chilled* program:

_____

_____

_____

Since the beginning of the program, what changes have occurred in how you support your adolescent (if any)?

_____

_____

_____

Below are a series of questions. Please circle the response that best reflects your answer.

1. Please rate how confident you are in your ability to support your adolescent's future social and emotional development:

Not at all **Very much**

1 2 3 4 5

2. To what extent did your child enjoy participating in the *Chilled* Program?

Not at all **Very much**

1 2 3 4 5

3. How satisfied were you with the content covered in the program?

Not at all satisfied **Very satisfied**

1 2 3 4 5

4. To what extent has your adolescent talked with you about the program?

None **A great deal**

5. From your own observations, as well as comments you may have received from others, how effective do you feel the program was in helping your adolescent?

Not at all effective				**Very effectiv**
1	2	3	4	5

6. To what extent have you noticed positive changes in your adolescent since participating in the program?

None				**A great deal**
1	2	3	4	5

7. To what extent have you noticed negative changes in your adolescent since participating in the program?

None				**A great deal**
1	2	3	4	5

8. How satisfied were you with your parent group facilitator?

Not at all				**Very much**
1	2	3	4	5

9. Overall, how would you rate the program?

Not at all useful				**Very useful**
1	2	3	4	5

We would particularly welcome any other comments you have about the program. Please write any other comments in the space below:

_____

_____

_____

_____

Thank you for your attendance and support.

Appendix J: Adolescent Questionnaire

Program Satisfaction Questionnaire
Adolescent Version

This form will ask you about what you liked and didn't like about the *Chilled* program.
If you prefer to be asked the questions instead of writing the answers please let us know.

Please rate the following statements about the program on a scale of 1 to 5, where 1= "Not at all" and 5= "Very much"

Section A	**Not at all**			
1. I looked forward to the group each week.	1	2	3	4
2. The information was easy to understand.	1	2	3	4
3. The student guide was useful and easy to read.	1	2	3	4
4. The program was useful in my everyday life.	1	2	3	4
5. The program was helpful for getting along with friends.	1	2	3	4
6. The program was helpful for getting along with family members.	1	2	3	4
7. The program helped me have confidence in myself.	1	2	3	4
8. The program helped me to understand my feelings.	1	2	3	4
9. The program helped me cope with stress.	1	2	3	4
10. The program helped me to feel more positive about everyday life.	1	2	3	4
11. I talked about the program to my friends.	1	2	3	4
12. My friends have commented on changes in me as a result of the program.	1	2	3	4
13. I talked about the program with my family.	1	2	3	4
14. My family has commented on changes in me as a result of the program.	1	2	3	4
15. I would recommend the program to my friends.	1	2	3	4

Section B	**Not at all**			
1. Learning about feelings was useful.	1	2	3	4

2. Learning how to relax and cope with difficult situations was useful.	1	2	3	4
3. Learning how to recognize my anxious thoughts was useful.	1	2	3	4
4. Learning how to use helpful thoughts was useful.	1	2	3	4
5. Learning how create stepladders was useful.	1	2	3	4
6. Learning to be assertive was useful.	1	2	3	4
7. Learning how to improve my relationships with my friends and family was useful.	1	2	3	4

Section C

The activities I enjoyed most were:

The activities I did not enjoy were:

The skills I use most from the program are:

How would you make the program better?

Is there anything else you would like to say about the program?

Thank you for participating in the *Chilled* program